Coal Age

A McGRAW-HILL PUBLICATION FEBRUARY 1948

COAL REVIEW AND OUTLOOK

WESTINGHOUSE GEARMOTORS

NOW AVAILABLE FROM STOCK

Type C

Type E

YOU CAN BE SURE..
IF IT'S Westinghouse

Type A
Single-reduction

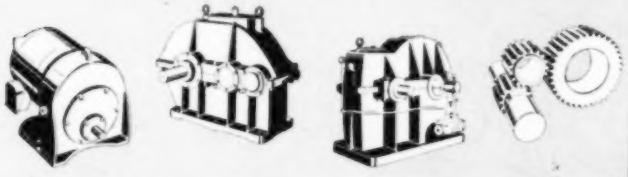
WESTINGHOUSE NOW OFFERS IMMEDIATE DELIVERY ON POPULAR SIZES AND TYPES

Westinghouse Gearmotors are today's best answer for obtaining speed reduction on drive applications from 1 to 75 hp. And now, Westinghouse offers immediate delivery from stock. More than 50 sizes and types are available, comprising commonly used designs, and a few units with special auxiliary features. Many are powered by the revolutionary new Life-Line motor . . . the greatest advance in motor design in 58 years. Call your nearby Westinghouse representative for details on gearmotors available to fit your needs. Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.

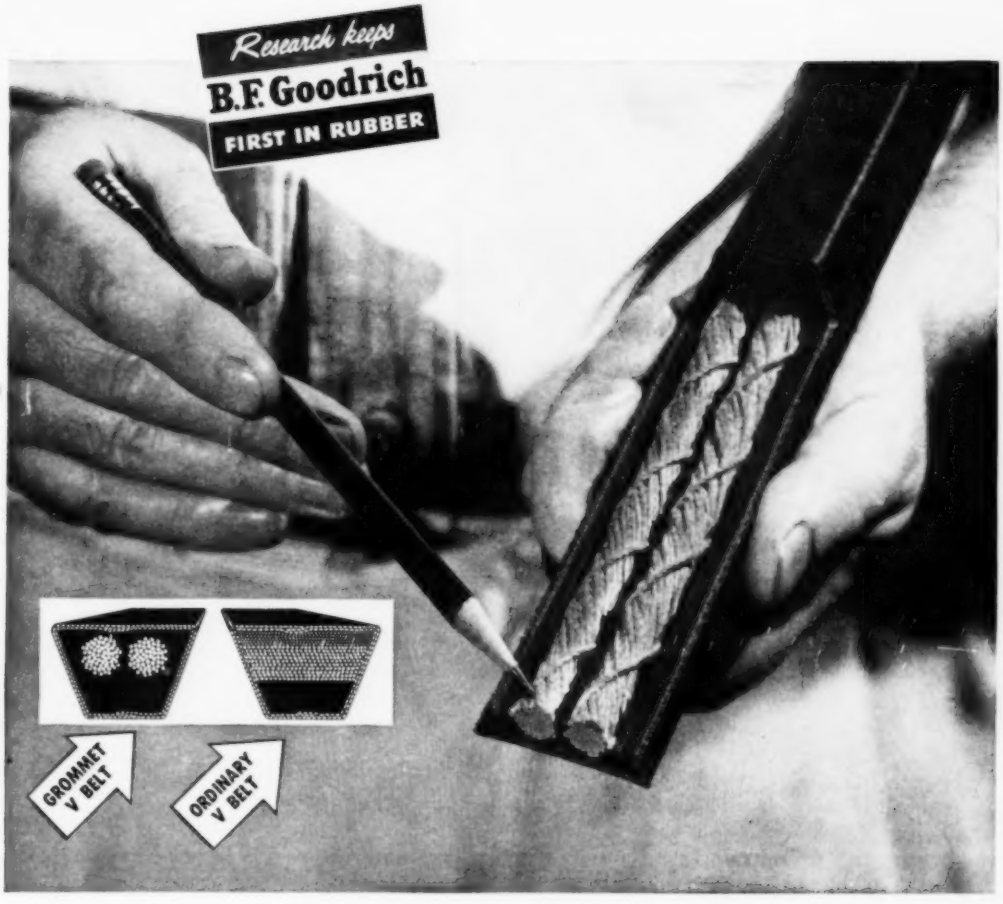
J-07273

Westinghouse

RPM FITTED DRIVES



GEARMOTORS • SPEED REDUCERS • SPEED INCREASERS • INDUSTRIAL GEARING



This V belt will cut your belt costs 20% to 50%

Only B.F.Goodrich makes the grommet belt—there's no other like it

THE B.F.Goodrich patented grommet belt lasts 20 to 50 per cent longer but costs no more than an ordinary V belt.

A grommet is *not a cable.* It is made by winding heavy cord *on itself* in an endless loop. (Cables are simply twisted cords; ends must be overlapped or spliced.)

Better than multiple cords. In a grommet belt all the cords work *all the time.* There are no cords in the *center* of the belt — which in an ordinary belt don't pull their share of the load.

More flexible. There is no splice, no stiff section where cords overlap. (85% of failures of ordinary belts occur in overlapped sections.) BFG belts have twin grommets, no fabric or plies in the middle of the belt that stiffen it and generate heat.

Stand shocks. Grommet belts run cooler, are stronger, have more *elasticity* but less *permanent* stretch than any other kind of belt. They stand sudden shock. Both laboratory and field tests have proved that they outlast all others, especially on hard drives.

Large sizes only. At present grommet belts are made only in largest sizes (D and E sections). Later, other sizes may be made.

More information. If you buy or use large-size V belts, don't do without the advantages grommet belts can give you. Talk to your BFG distributor. Or write, if you wish, for leaflet 2170. Address Dept. L-10, *The B.F.Goodrich Company, Industrial Products Division, Akron, Ohio.*

B.F.Goodrich
RUBBER FOR INDUSTRY

NOT *gone - and*

Years ago Hulburt advertising used to feature the FRICTION DEVIL — we don't do it now — but we haven't forgotten him — *because he's still a* **MENACE**

••

HULBURT OIL & GREASE COMPANY, PHILADELPHIA, PA.

Specialists in Coal Mine Lubrication

NOT *forgotten!*

Yes--

Hulburt *Quality* GREASE

is still chasing the Friction Devils out of Coal Mining Machinery — because it has the QUALITY and because it is made to do that one job — *Supremely Well*

MINING MACHINE CABLE WITH *THIS COMBINATION*

IS WITHOUT EQUAL FOR SAFETY AND LONG LIFE

No matter how good a service record a Hazard Cable earns, Hazard Engineers are never satisfied. They keep seeking for ways to make it better. When they find one, they put it into effect.

So now, with Hazard Mining Machine Cable, you get the additional benefits of a new Hazaprene ZBF Jacket — at no extra cost. This improved jacket has greater resistance to flame and mechanical damage than was ever obtainable before. The Hazaprene ZBF Jacket is a double layer, reinforced, pressure-cured, unusually dense *seal against trouble.*

Beneath this new safety and toughness, you also obtain the advantages of flexible Hazaloy-coated conductors . . . safer, longer-lived Hazard heat-resisting rubber insulation that takes in its stride current overload surges. And for still more moisture-resistance, cushioning qualities and flexibility, Hazaprene fillers are used in the conductor interstices of multi-conductor cables in place of the old-style fibrous fillers.

*ZBF ZINC BORATE FORMULA

Flame tests have shown that Zinc Borate imparts greatly increased fire-resistant properties to neoprene compounds with burning rates reduced by as much as 20% and weight losses by as much as 40%. Afterglow is materially reduced also. Millions of feet of cable protected by this type of jacket were used during the war by the Navy for special operating conditions to gain extra fire protection. Hazaprene ZBF Jackets mean not only greater safety because of unusual flame-resistance and lack of afterglow — but also longer life through increased resistance to abrasion, wear and tear.

Why not get in touch with your Hazard Representative now and talk to him about your new mining machine cables, or write Hazard Insulated Wire Works, Division of The Okonite Company, Wilkes-Barre, Pa.

HAZARD

7062

insulated wires and cables for every mining use

Coal Age

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CONTENTS

Volume 54 — FEBRUARY, 1949 — Number 2

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CHANGE OF ADDRESS

Director of Circulation, COAL AGE
330 West 42nd St., New York 18, N. Y.

Please change the address of my COAL AGE subscription as follows:

Name .....

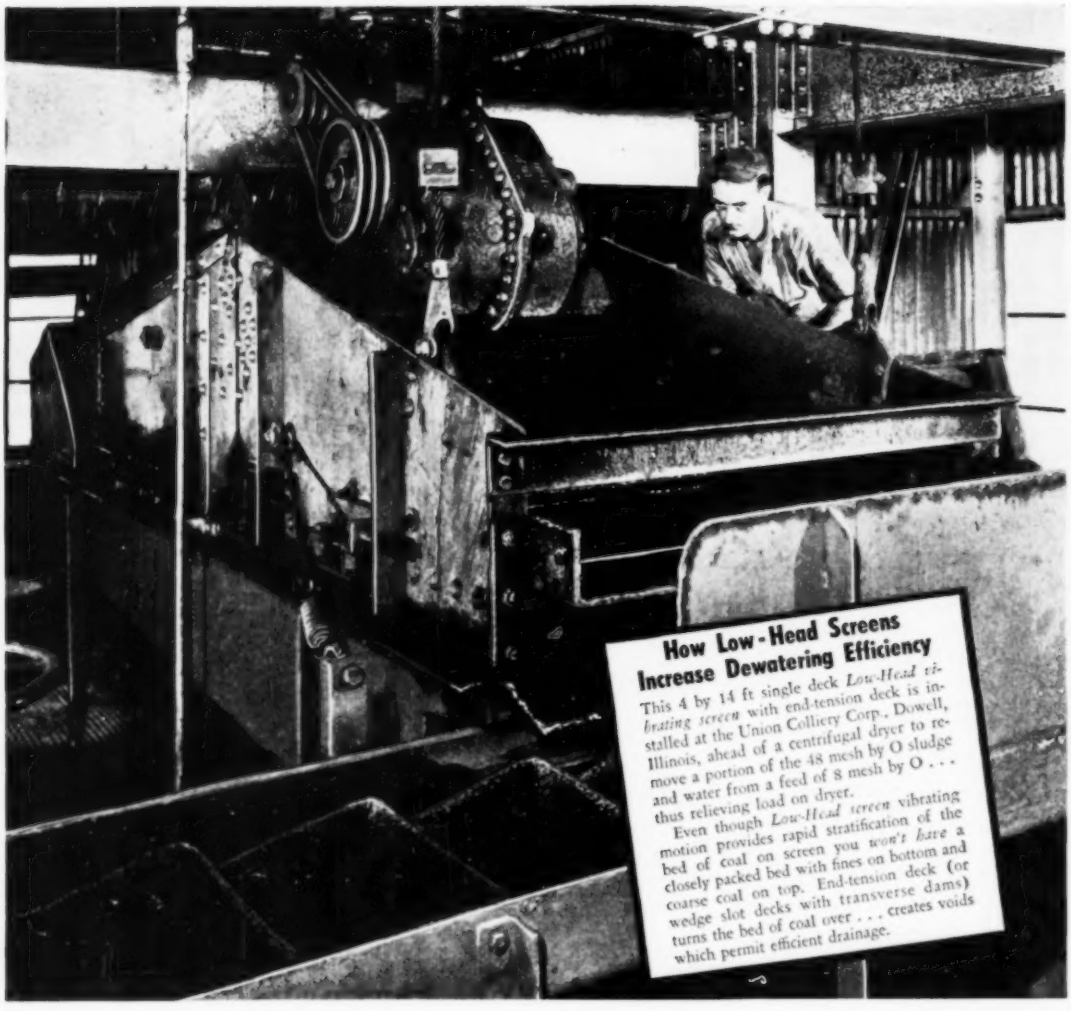
Old Address .....

New Address .....

New Company Connection .....

New Title or Position .....

How to Cut Dewatering Costs...



How Low-Head Screens Increase Dewatering Efficiency

This 4 by 14 ft single deck *Low-Head vibrating screen* with end-tension deck is installed at the Union Colliery Corp., Dowell, Illinois, ahead of a centrifugal dryer to remove a portion of the 48 mesh by 0 sludge and water from a feed of 8 mesh by 0 . . . thus relieving load on dryer.

Even though *Low-Head screen* vibrating motion provides rapid stratification of the bed of coal on screen you *won't have* a closely packed bed with fines on bottom and coarse coal on top. End-tension deck (or wedge slot decks with transverse dams) turns the bed of coal over . . . creates voids which permit efficient drainage.

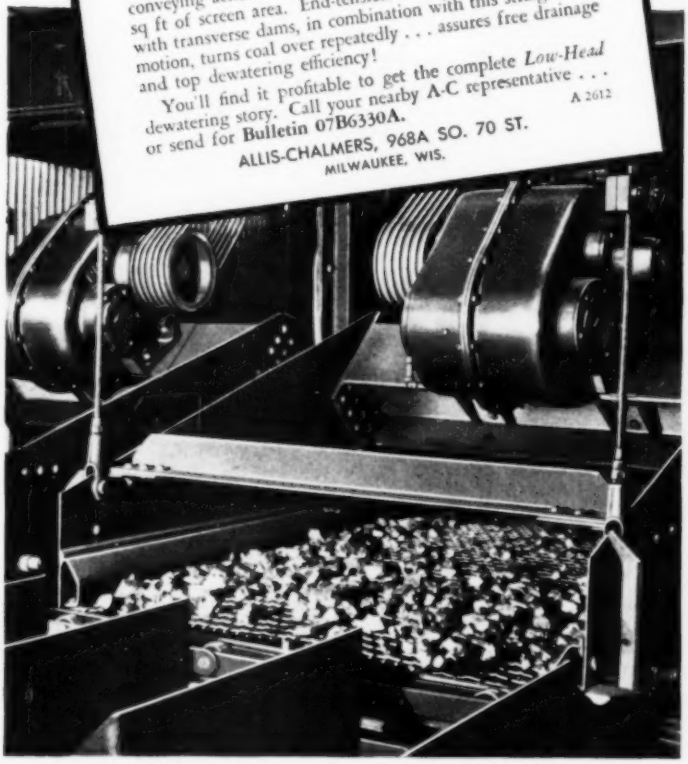
AND GET INCREASED CAPACITY, TOO — WITH LOW-HEAD DEWATERING SCREENS!

SPECIFY *LOW-HEAD vibrating screens* with reverse end-tension deck for sludge screening and dewatering small coal. For dewatering large coal and for pre-wetting ahead of heavy density units specify *Low-Head screens* with side tension deck.

Here's why: The *Low-Head screen* operates horizontally — saves headroom . . . saves installation costs. Straight-line vibrating motion at 45° to the horizontal results in a definite conveying action and in maximum dewatering capacity per sq ft of screen area. End-tension deck, or wedge slot deck with transverse dams, in combination with this straight-line motion, turns coal over repeatedly . . . assures free drainage and top dewatering efficiency!

You'll find it profitable to get the complete *Low-Head* dewatering story. Call your nearby A-C representative . . . or send for **Bulletin 07B6330A.** A 2612

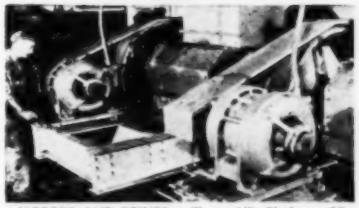
ALLIS-CHALMERS, 968A SO. 70 ST.
MILWAUKEE, WIS.



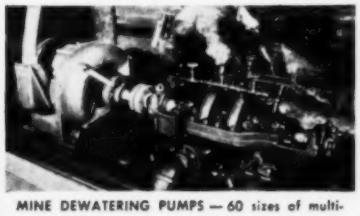
LOW-HEAD SCREENS are also used for wet or dry sizing. They combine high strength and light weight. Welded parts are "stress-relieved" to eliminate strain around welds. Support frames are designed to provide long screen surface life. Sizes 3 by 6 to 6 by 16 ft.

Low-Head, Vari-Pitch, Texrope are Allis-Chalmers trademarks

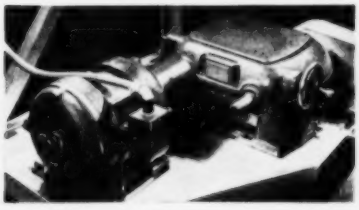
OTHER COST-CUTTING TONNAGE-INCREASING PRODUCTS FOR COAL



MOTORS AND DRIVES — These Allis-Chalmers 25 hp motors and Texrope drives supply reliable power for stoker coal crushers in coal cleaning plant. Complete Allis-Chalmers motor line, 1 hp and up, includes explosion-proof motors approved for Class I-D or 2-G locations. **Bulletin B6052H.**



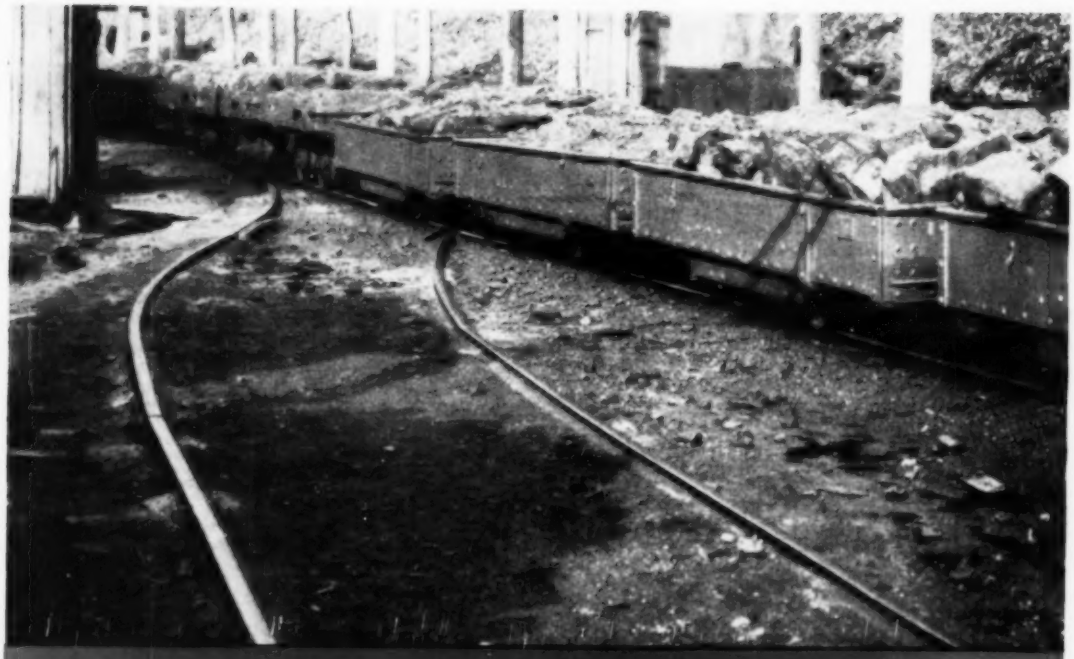
MINE DEWATERING PUMPS — 60 sizes of multi-stage high head pumps are built by Allis-Chalmers, with heads to 2,000 ft; capacities to 10,000 gpm; 2 to 7 stages. Above is two stage pump rated 150 gpm; 800 ft head; 3,500 rpm, used in mine dewatering service. Can be serviced without disturbing piping.



VARI-PITCH SPEED CHANGER on conveyor drive provides 300 to 375 percent speed change with the turn of a hand wheel. Two wide-range, worm adjusted sheaves are combined in a compact, enclosed unit. Adjustable to fractions of a revolution. **Send for Bulletin 2086013C**

ALLIS-CHALMERS

. . . Builds for Coal Progress!



Get a head start toward higher tonnage

Even in winter weather, Texaco Olympian Grease makes mine cars start and move easier.

Tune in
TEXACO STAR THEATRE
presents MILTON BERLE
every Wednesday night.
METROPOLITAN OPERA
broadcasts every
Saturday afternoon.

TEXACO

TEXACO LUBRICANTS

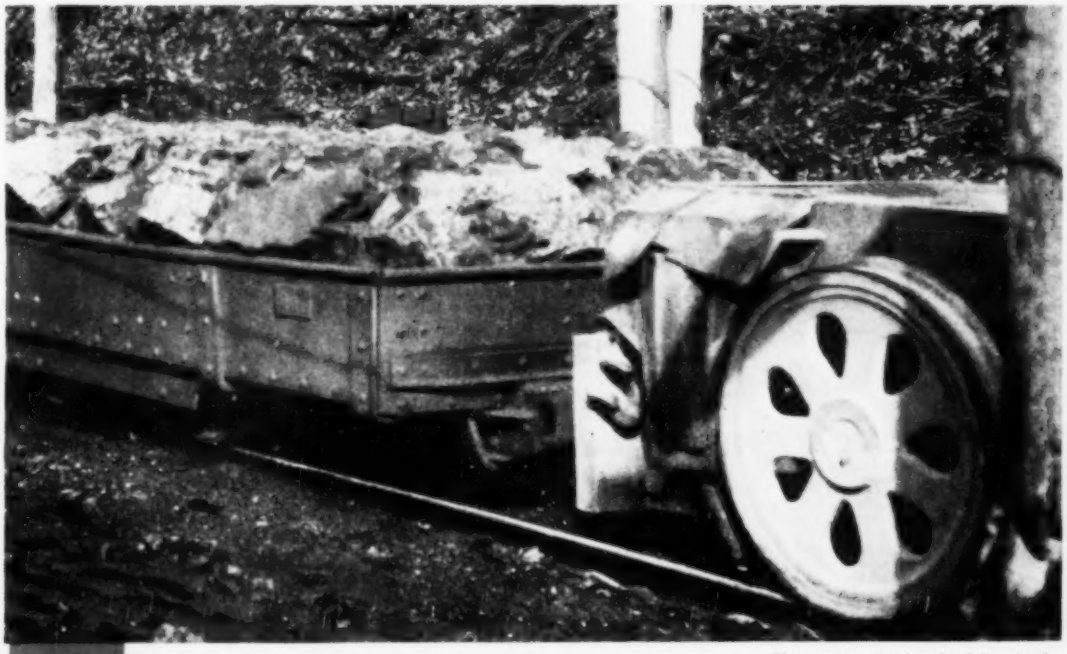


Photo courtesy American Car & Foundry Co.

MINE cars start and roll more easily . . . allowing trains to carry more tonnage and make more trips per shift . . . when you lubricate car wheel bearings — plain, cavity-hub or anti-friction — with *Texaco Olympian Grease*.

Texaco Olympian Grease is made in three consistencies to meet all mine car requirements. It resists oxidation, separation and leakage . . . seals out dirt and moisture . . . stays in the bearings under all temperature conditions. Use it to prolong bearing life, reduce costs, move more tonnage — more quickly.

For more efficient performance from hydraulically operated equipment, use *Texaco Regal Oils (R & O)* as the hydraulic medium. These turbine-grade oils resist oxidation and rust formation, and are processed to prevent foaming. They keep systems *clean* — help avoid costly stoppages.

A Texaco Lubrication Engineer can help you increase efficiency and lower costs throughout your mine. Just call the nearest of the more than 2400 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, *National Sales Division, Dept. C*, 135 E. 42nd St., N. Y. 17, N. Y.

TEXACO MAINTENANCE LUBRICATION CHARTS: Leading manufacturers of underground coal mining machinery approve Texaco Lubricants for use on cutters, loaders, locomotives, etc., and have cooperated in preparing these charts. Charts show clearly where and when to use the proper Texaco Lubricant. Order the charts you need by make and model of each machine.

For the Coal Mining Industry

As seen in
America's newest and finest
Brattice Cloth Mill
making the new

UPSON-WALTON *Brattice Cloth*

★

Not merely dry—it's DRY PROOFED under ELECTRONIC CONTROL

Write for free copy of "Brattice Cloth Facts"

THE UPSON-WALTON COMPANY

Manufacturers of Wire Rope, Wire Rope Fittings, Tackle Blocks, Brattice Cloth

Main Offices and Factory: Cleveland 13, Ohio

114 Broad Street, New York 4 · 3525 West Grand Ave., Chicago 51 · 241 Oliver Building, Pittsburgh 22

One of two matched "Caterpillar" units owned by Easley & Henry. This D8 Tractor with No. 8A Bulldozer is pushing rocky overburden to the dragline in their coal mine near Providence, Ky.

PACE SETTER FOR PROFIT

GETTING more work done at lower cost is a sure way to make money—and use of "Caterpillar" matched earthmoving equipment helps you do just that. This equipment, designed and built to work in perfect co-ordination with the tractors, means a faster job at lower over-all cost.

At their coal mine near Providence, Ky., Easley & Henry operate two "Caterpillar" Diesel D8 Tractors with matched equipment. One is equipped with a "Caterpillar" angling Bulldozer and Ripper. The other handles a No. 80 Scraper. The 'dozer unit speeds the building of mine roads and pushes rocky overburden to the dragline. The scraper outfit is used mostly to strip overburden. Between the two, they set a money-making pace.

Partner S. I. Henry says: "I've used 'Caterpillar' equipment all my life and I'm mighty sure you can't beat it."

Other mine owners who use "Caterpillar" matched equipment agree on that score. They're keen, too, about the service they get from their dependable "Caterpillar" dealer.

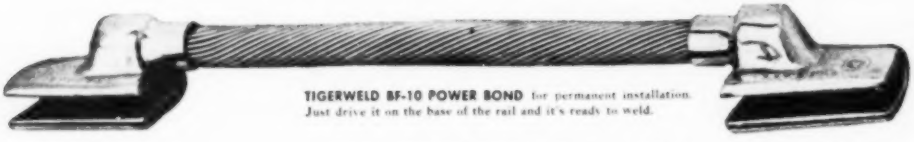
CATERPILLAR
REG. U. S. PAT. OFF.

DIESEL ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

CATERPILLAR TRACTOR CO. • PEORIA, ILLINOIS

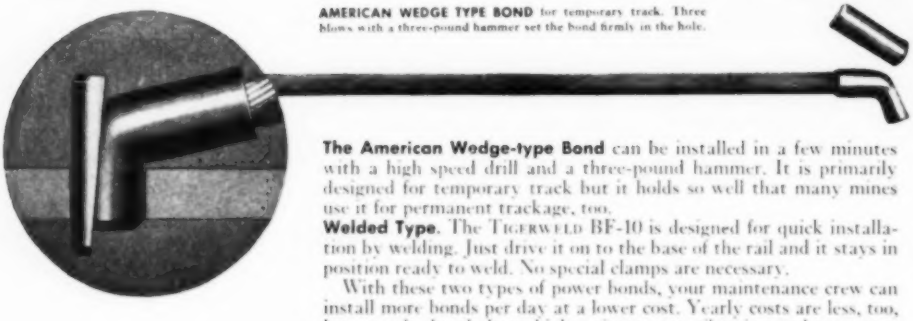
Maintenance Men "go for" these bonds

THEY GO ON FASTER... STAY PUT LONGER...



TIGERWELD BF-10 POWER BOND for permanent installation. Just drive it on the base of the rail and it's ready to weld.

AMERICAN WEDGE TYPE BOND for temporary track. Three blows with a three-pound hammer set the bond firmly in the hole.



The American Wedge-type Bond can be installed in a few minutes with a high speed drill and a three-pound hammer. It is primarily designed for temporary track but it holds so well that many mines use it for permanent trackage, too.

Welded Type. The TIGERWELD BF-10 is designed for quick installation by welding. Just drive it on to the base of the rail and it stays in position ready to weld. No special clamps are necessary.

With these two types of power bonds, your maintenance crew can install more bonds per day at a lower cost. Yearly costs are less, too, because the bonds have high resistance to vibration and great mechanical strength. They won't shake loose.

For complete information on all types of U·S·S TIGERWELD Rail Bonds, write to our nearest district office. Ask for the rail bond book.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS

TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS

UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

U·S·S American Rail Bonds

UNITED STATES STEEL

JOY LOADERS

Designed for Thin-Seam Mining

The JOY 14-BU, a high-production loader for thin seams.

JOY 14-BU, only 30½" high, can work with top efficiency in seams as thin as 34". Loads onto JOY 32" Shuttle Cars or JOY Belt and Chain Conveyors. Capacities up to 8 tons/min.

JOY 12-BU, the loader that sets the pace in thin-seam conveyor mining. Only 28¾" high, will operate efficiently in 30" seams under most conditions. Capacities up to 1½ tons/min.

Consult a Joy Engineer

...THEY MORE THAN PAY THEIR WAY!

JOY builds the world's most complete line of mining equipment... rugged, proved machines that will increase tonnage and reduce costs under your mining conditions

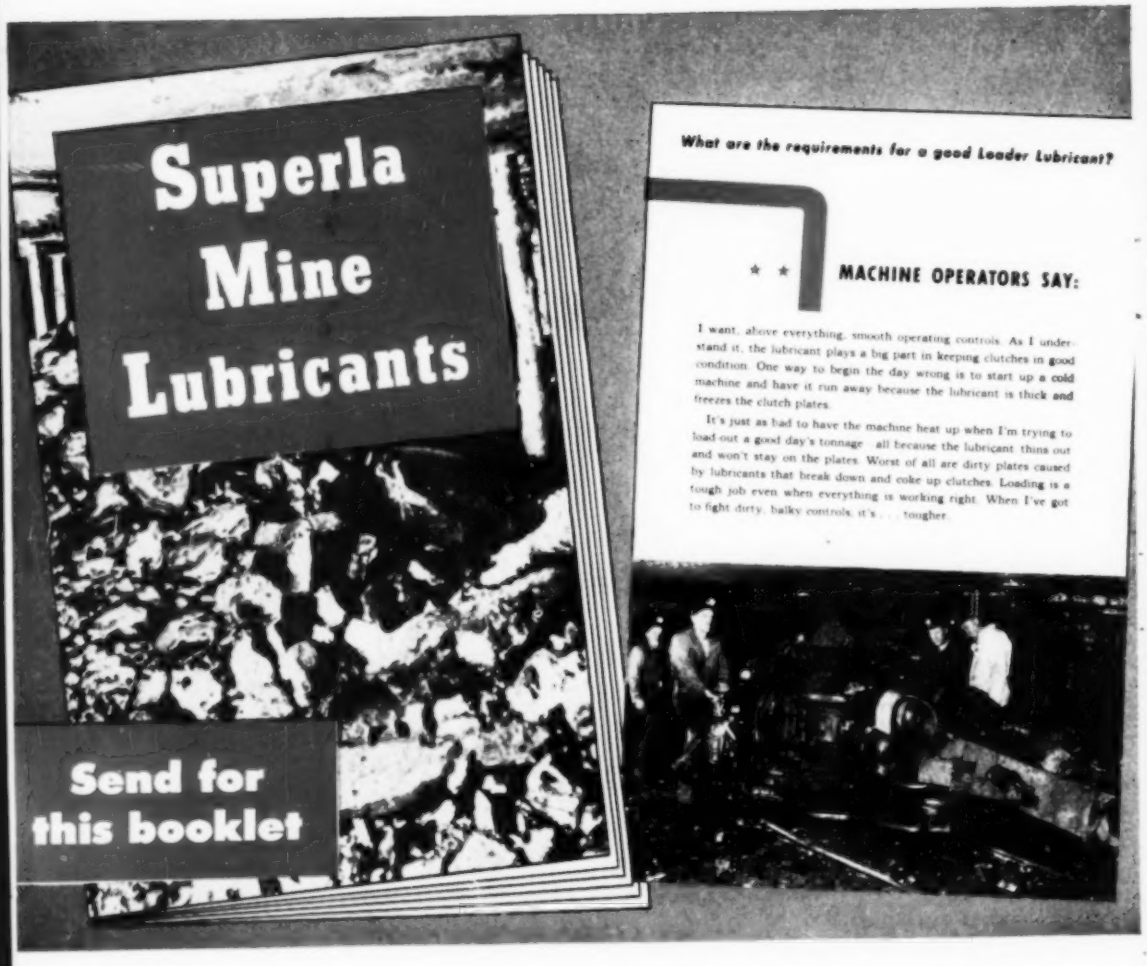
W & O CL2215

JOY MANUFACTURING COMPANY

GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

Meet the lubricants that meet . .



Six Grades for Lubricating Any Type of Cutter or Loader

No. 00 An oxidation-inhibited oil containing a detergent additive. It provides exceptionally clean operation and low oil consumption for oil-lubricated gear cases.

No. 0 A high-quality additive-type oil similar to No. 00 but of a slightly heavier grade. It is designed for Goodman loaders and cutters.

No. 2 A soft, semi-fluid grease for lubricating gathering-head gear cases where greater fluidity is desired than that usually provided by most loader greases.

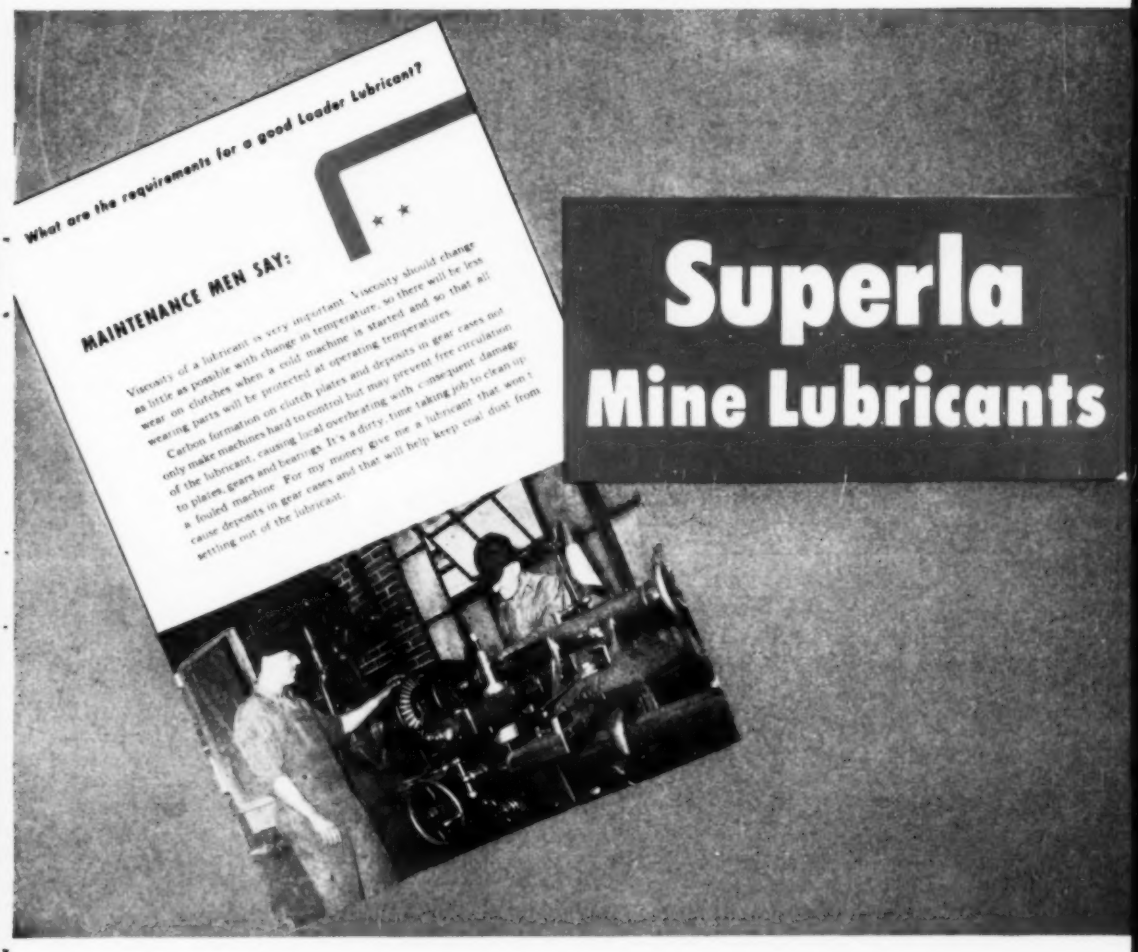
No. 4 A semi-smooth grease particularly resistant to thinning out under heat and mechanical working. At the same time it can easily be poured from the barrel bung at ordinary mine temperatures. It is especially designed for Joy loaders.

No. 6 A grease of heavy consistency and good high-temperature characteristics. Its fibrous structure makes it particularly useful on mine car wheels and for general underground lubrication.

No. 8 A smooth grease having superior high-temperature characteristics. It is suitable for armature bearings and pressure-gun work where a grease of heavy consistency is desired.

STANDARD **STANDARD OIL COMPANY (INDIANA)**

.....your loader needs



THE BOOKLET illustrated at the left describes how the new and improved Superla Mine Lubricants meet your specific requirements for mine machine lubrication.

Mine men – and what they want in loader and cutter lubricants – played an important part in the development of Superla Mine Lubricants. The booklet summarizes the suggestions of oilers, machine operators, maintenance men, and supervisory officials. It tells how Superla Mine Lubricants fulfill all their requirements.

Midwest mines have quickly accepted Superla Mine Lubricants as superior for oil- and grease-lubricated loaders and cutters and other underground equipment. In these mines, the work of oilers, machine operators, and maintenance men has been lightened. Loaders have stayed on the job longer without downtime for repairs. Why these improved lubricants will help you reduce maintenance and boost tonnage in your mine is explained in the Superla Mine Lubricants booklet. A copy will be sent at your request.

If your mine is located in the Midwest, write Standard Oil Company (Ind.), 910 S. Michigan Ave., Chicago 80, Illinois.

STANDARD OIL COMPANY (INDIANA) STANDARD

WHEN BIGGER THINGS WERE DONE FOR COAL-

C&O Did Them... All Along the Line!

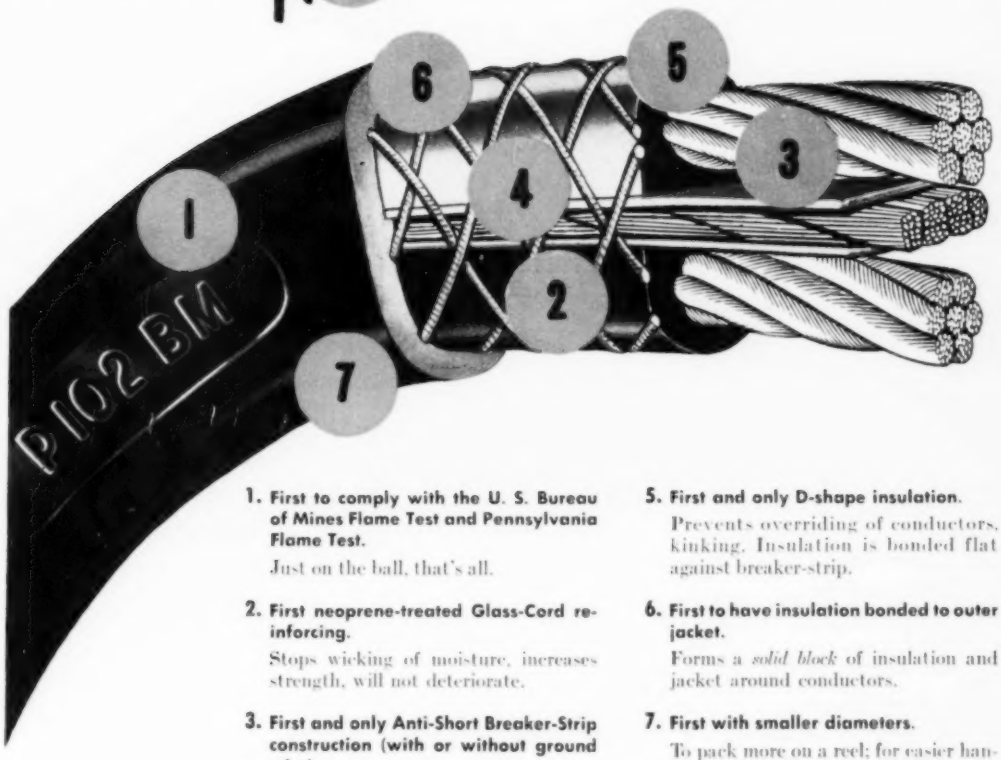
C&O stands on its record of down-the-line expansion for coal. Through every phase of railroad operation—from equipment to personnel—C&O has kept pace with the gigantic forward strides of the coal industry. This has been and will continue to be C&O policy in its determination to keep growing with coal.

- **Chesapeake and Ohio had on May 1, 1948, 63,455 cars serving the coal industry. More than 5,000 new coal cars were placed in service during the last eight months of 1948.**
- **C&O had 1,181 *coal-burning* locomotives in service as of July 1, 1948. During the last half of the year, 50 more were delivered.**
- **The daily coal loading record was broken six times during 1947 and that record has been exceeded seven times in 1948. In the 1947 record year, 1,412,458 cars of coal were loaded by C&O.**
- **1550 miles of track make up the principal assembly and classification yards on the C&O. Since 1937, 87 miles of track have been added to these yards. During the last ten years, 529 track miles of CTC service have been installed.**
- **42,000 employees are on the job at C&O, most of whom are directly concerned with the efficient movement of coal.**

CHESAPEAKE & OHIO RAILWAY

Largest Originating Carrier of Bituminous Coal in the World

Count the FIRSTS in Securityflex Cable



1. **First to comply with the U. S. Bureau of Mines Flame Test and Pennsylvania Flame Test.**
   Just on the ball, that's all.

2. **First neoprene-treated Glass-Cord reinforcing.**
   Stops wicking of moisture, increases strength, will not deteriorate.

3. **First and only Anti-Short Breaker-Strip construction (with or without ground wire).**
   Permits heavier impact.

4. **First parallel mine cable with ground wire.**
   Four years ahead of the industry.

5. **First and only D-shape insulation.**
   Prevents overriding of conductors, kinking. Insulation is bonded flat against breaker-strip.

6. **First to have insulation bonded to outer jacket.**
   Forms a *solid block* of insulation and jacket around conductors.

7. **First with smaller diameters.**
   To pack more on a reel; for easier handling. Now adopted by U. S. Bureau of Mines.

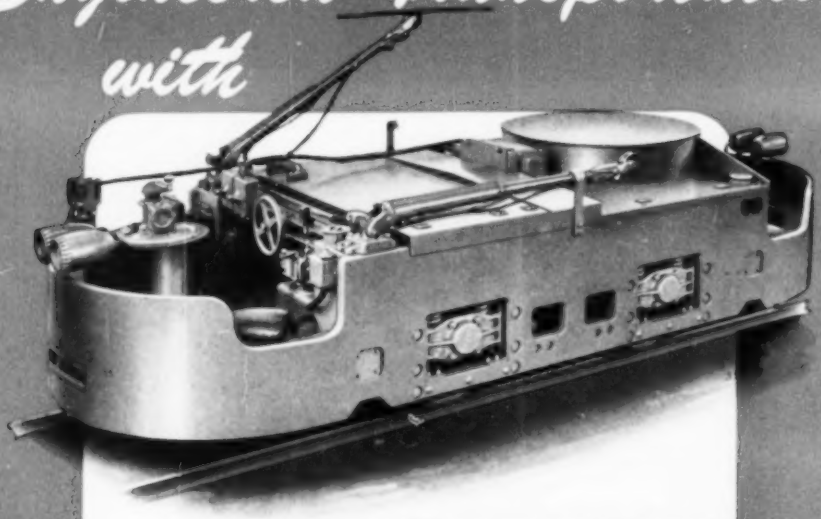
REMEMBER, ANACONDA RESEARCH AND ENGINEERING FACILITIES ARE AT YOUR SERVICE

Add to these basic *firsts:* the advantages of Anaconda mine cable's specially compounded, extra tough *neoprene* outer jacket . . . improved, heat resisting insulation . . . superior manufacturing techniques. Call the nearest Anaconda office to know how you can mine more tons per cable—with Securityflex.

ANACONDA WIRE & CABLE COMPANY
25 Broadway, New York 4, N. Y.

ANACONDA *Securityflex* **MINE CABLE** ANACONDA

Engineered Transportation with



JEFFREY LOCOMOTIVES

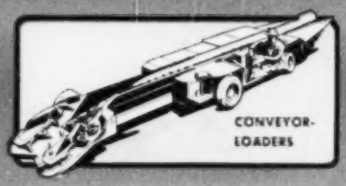
Gathering and Haulage Types

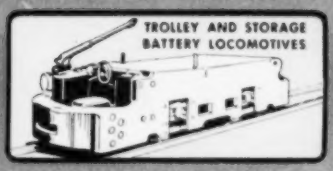
The widely diversified conditions prevailing throughout coal properties requires transportation equipment that is designed to meet the specific needs of that property.

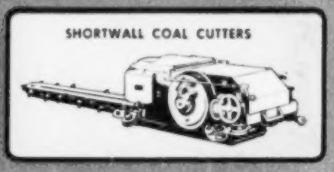
For more than 65 years Jeffrey has been designing, developing and building locomotives for coal mine service. With this wealth of experience and a corps of specially trained engineers Jeffrey is in a position to help you with your transportation system.

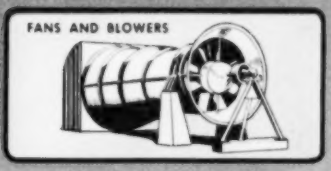
There are three types—trolley, cable reel and storage battery—to cover all phases of service either gathering or main haulage . . . and under all operating conditions.

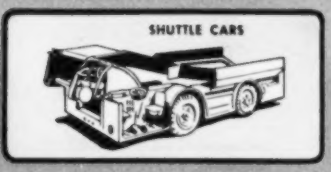
One of the new streamlined locomotives is shown above. It is an 8-ton explosion tested job.

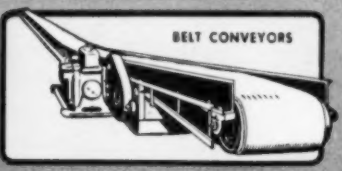


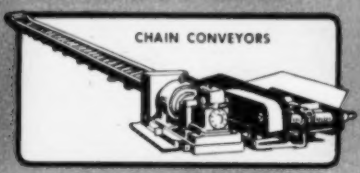


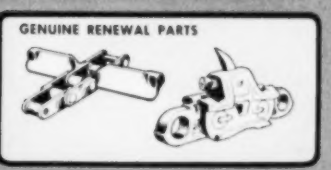












JEFFREY

EQUIPMENT FOR COAL MINES

and

GENUINE RENEWAL PARTS

THE JEFFREY MANUFACTURING COMPANY

Established 1877

General and Export Sales Offices

COLUMBUS 16, OHIO, U. S. A.

DISTRICT SALES OFFICES

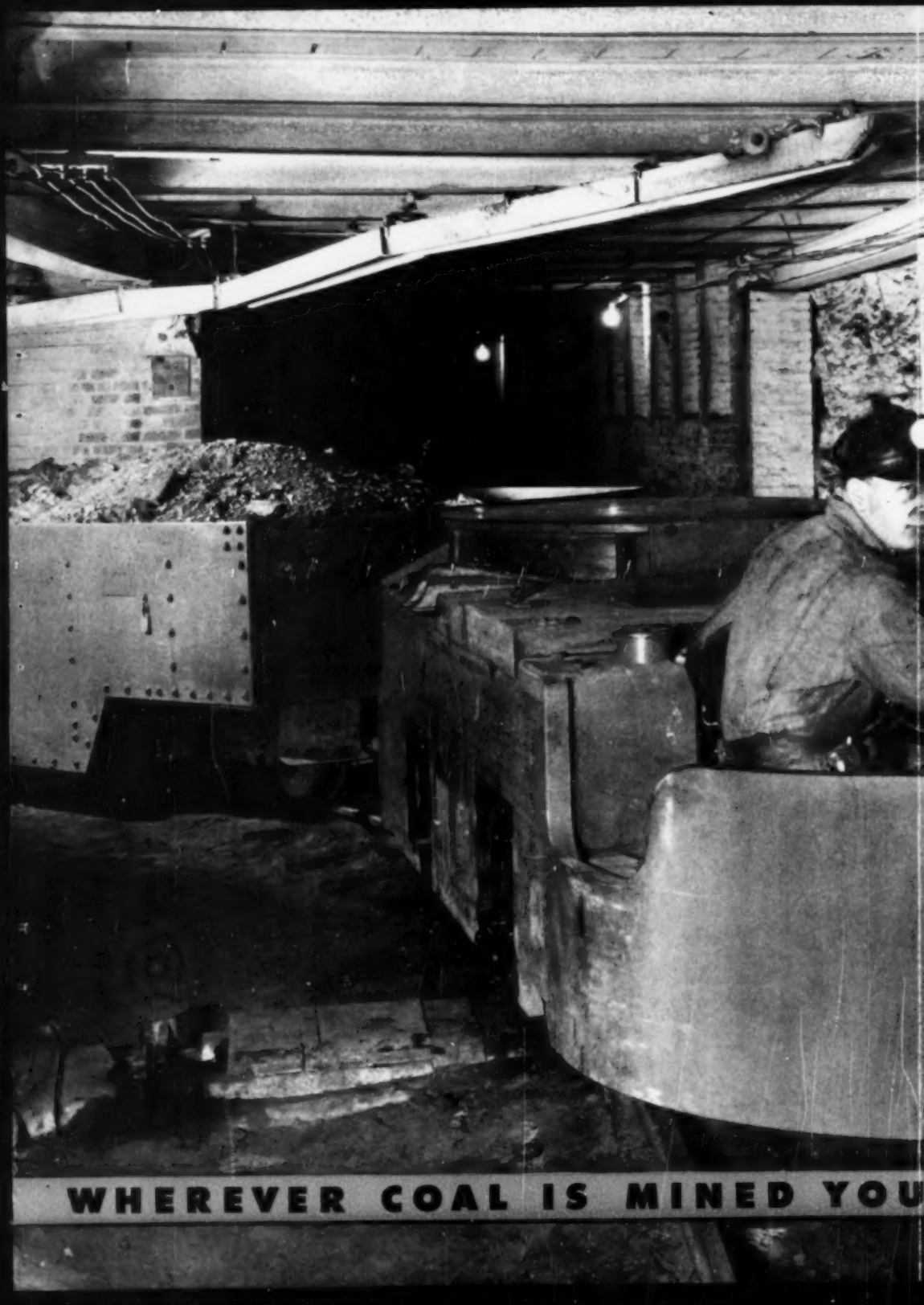
BALTIMORE 2, MD., Munsey Bldg.
BIRMINGHAM 3, 2210 Third Ave., N.
BOSTON 16, 38 Newbury Street
BUFFALO 2, Jackson Building
CHICAGO 1, Bell Building
CINCINNATI 2, Carew Tower
CLEVELAND 13, Rockefeller Building
DENVER 2, Ernest & Cranmer Bldg.
DETROIT 11, 5008 St. Jean Avenue
HARLAN, Kentucky
HOUSTON 5, TEXAS, 3748 Rice Blvd.
HUNTINGTON 19, W. VA., Guaranty Bank Bldg.
JACKSONVILLE 5, 4314 Forest Park Road
MILWAUKEE 2, 735 N. Water Street
NEW YORK 7, 10 Church Street
PHILADELPHIA 3, Broad St. Station Bldg.
PITTSBURGH 22, Oliver Building
SALT LAKE CITY 1, 101 W. 2nd South St.
ST. LOUIS 1, Railway Exchange Bldg.
SCRANTON 3, 122 Adams Avenue

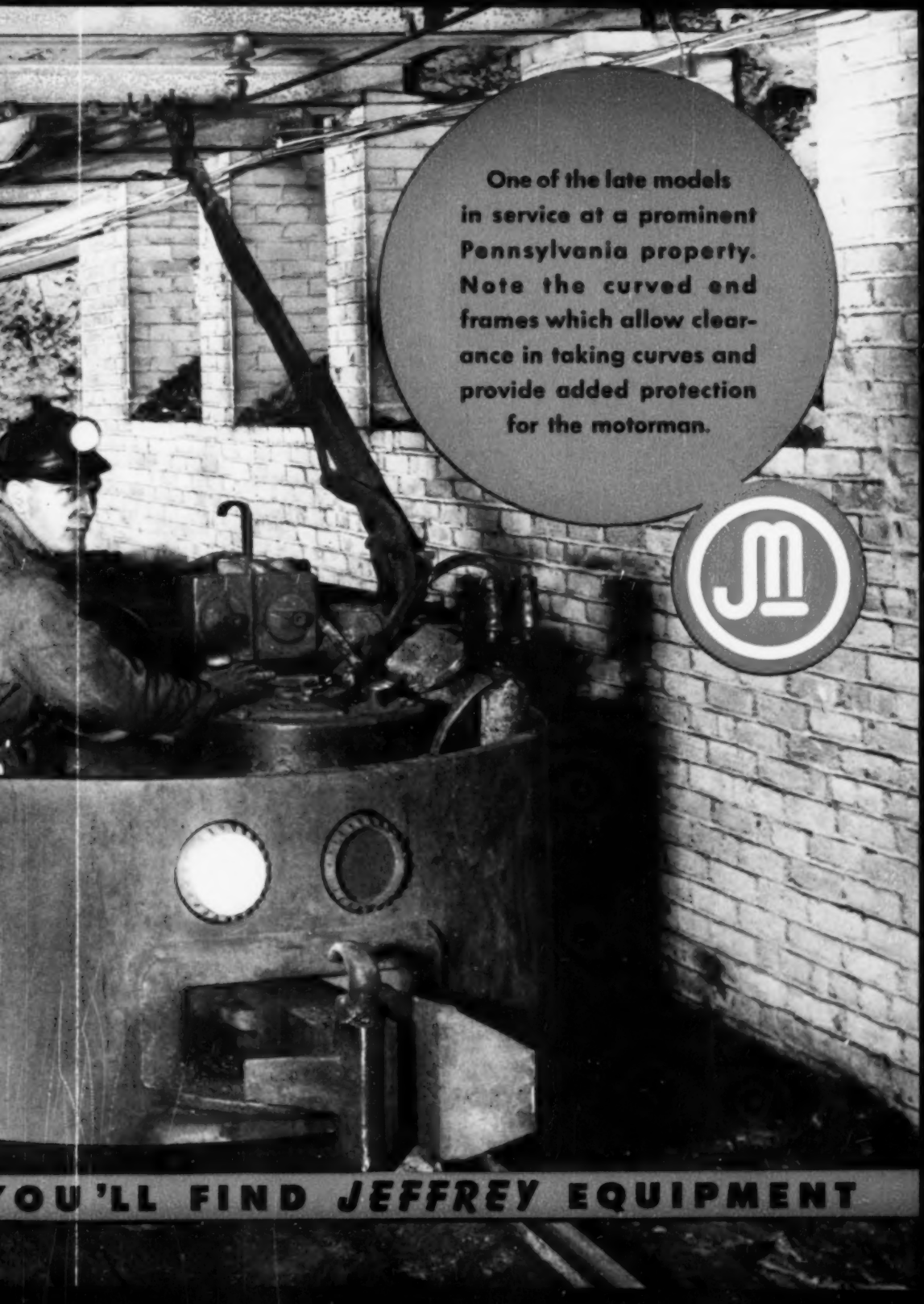
SERVICE STATIONS

PITTSBURGH, SCRANTON, BIRMINGHAM, HARLAN, KY., MT. VERNON, ILL., LOGAN AND BECKLEY, W. VA.

FOREIGN PLANTS

JEFFREY MANUFACTURING CO. LTD., Montreal, Quebec
BRITISH JEFFREY-DIAMOND LTD., Wakefield, England
JEFFREY-GALION (PTY.) LTD., Johannesburg


WHEREVER COAL IS MINED YOU


One of the late models in service at a prominent Pennsylvania property. Note the curved end frames which allow clearance in taking curves and provide added protection for the motorman.
JM
OU'LL FIND JEFFREY EQUIPMENT

"$6000 A YEAR SAVED IN POWER COSTS . . . RELOCATING COSTS CUT IN HALF!"

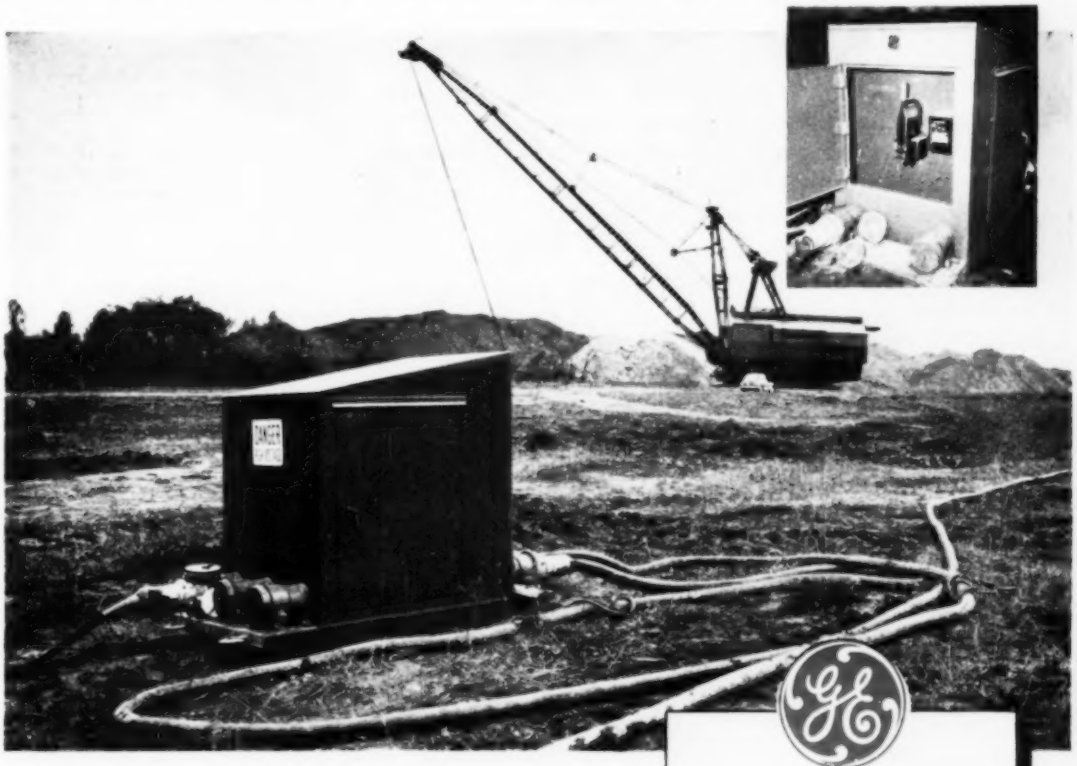
That's what Mr. Evans Bennington, Supt. of Electrical Maintenance at Maumee Collieries, says of their co-ordinated G-E power distribution system for strip mining units.

Here's an outstanding example of modern, efficient mine power distribution—the Maumee Collieries Company's strip mining operations at Terre Haute, Indiana. A fully co-ordinated General Electric system, it teams up unit substations, cable, and cable-skid switch houses to cut production delays with better voltage at the pit, provide maximum safety to workmen and equipment, and reduce moving time and costs.

"Use of G-E cable and cable skids," says Mr. Bennington, "has given us a most flexible power-system arrangement for feeding shovels, draglines, loaders and other excavating equipment. The initial cost of a cable distribution system, compared with an overhead line, is approximately the same. But the cost of moving the cable system is about one-half or less the cost of moving an overhead line system. When you consider that this system has to be changed on an average of at least every six months, the saving is tremendous.

"By buying power at 33,000 volts, we have been able to combine three metering points into one. This has resulted in putting two of the operations in the low kilowatt-hour bracket. In addition, the power company gives us a 10 percent rebate for owning our own substation, which, combined with the kilowatt-hour savings, saves us about $6000 a year."

You can bring new speed, flexibility and safety plus new economies to your surface mining operations with a completely integrated G-E power distribution "package". A G-E engineer with years of experience in mining problems will gladly give you the facts. Call him at your nearest G-E office. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*



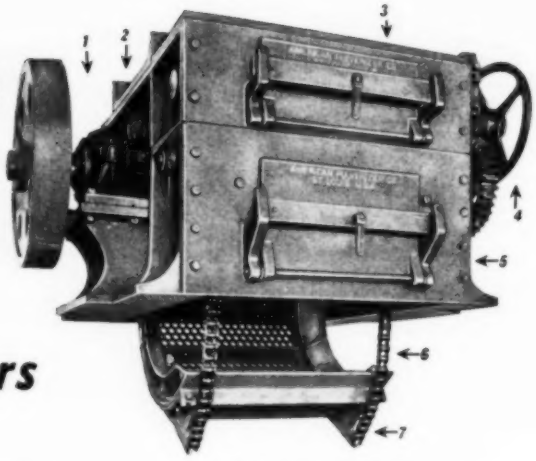
This newest-type General Electric cable-skid switch house, one of twelve in use by Maumee, provides maximum portability and convenience plus more selective tripping. Unit, weighing 1600 lbs., measures 40 in. wide, 48 in. deep, 51 in. high in front and 43 in. high in rear, exclusive of skid. Front has two sockets for incoming trunk-line cable connections (see inset, above). From the three load outlets at the rear, portable cable brings power to strip mining units. Most of Maumee's 35,000 to 40,000 feet of portable cable is G-E Type SH-D, highly resistant to rough handling and excessive flexing.

POWER DISTRIBUTION SYSTEMS

—to cut mining costs per ton!

A NEW ANGLE TO COAL PREPARATION

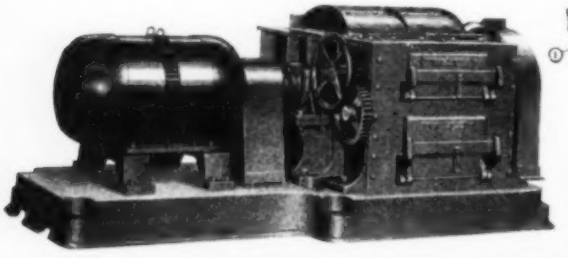
With American Rolling Ring Crushers



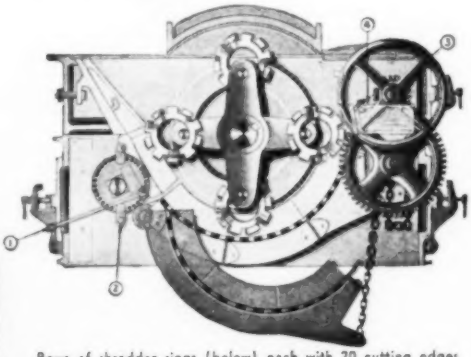
7 OPERATING FEATURES:

(1) Dust-tight, grease-lubricated, self-aligning pillow blocks with anti-friction bearing. (2) Massive sectional steel frame with dust-tight machined joints. (3) Door to easily cleaned metal trap. (4) Hand-wheel to adjust the position of setting of cage. (5) Inspection door to crushing chamber. (6) Chains to raise and lower cage. Raising cage makes product finer, lowering cage makes product coarser—or cage can be dropped completely as shown. (7) Screen cage with sectional manganese steel side liners.

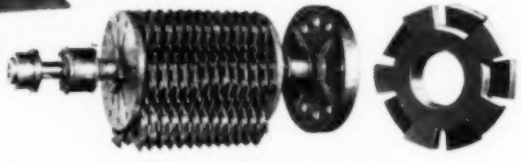
The gains in tonnage underground are too easily offset by obsolete coal preparation at the top, resulting in too small a yield of the most marketable sizes. Control your sizing with the most modern crusher action which *splits*—instead of crushes—coal. Size control is continuously maintained with a minimum of undesirable fines—and with no oversize. Americans are flexible, with a wide range of reduction, to suit varying market demands.



Americans are available in capacities of 50 to 500 TPH.



Rows of shredder rings (below) each with 20 cutting edges revolve freely on their own shafts. Cage prevents oversize, rotor revolves slowly, keeping fines to a minimum.

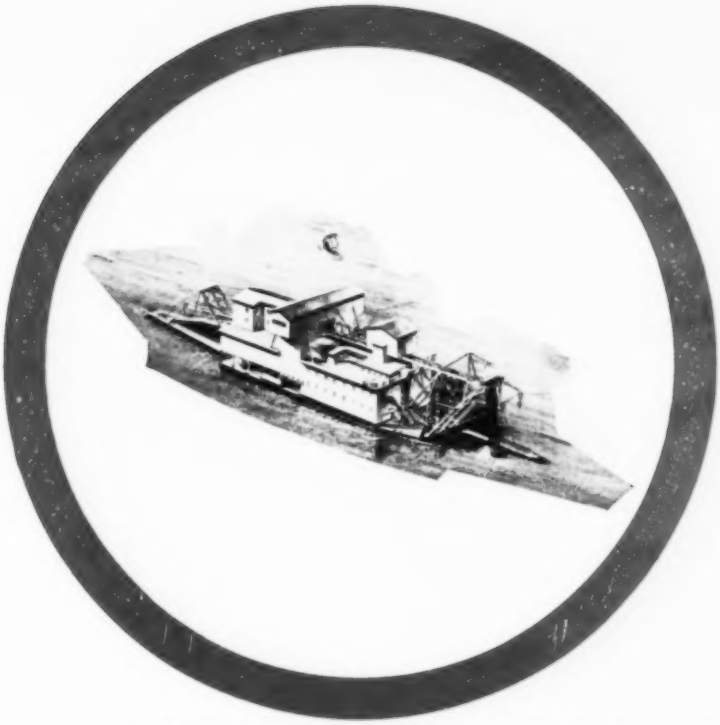


Write for "AC Coal Crushing Bulletin."

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

1119 Macklind Avenue
St. Louis 10, Mo.



Simplex Anhydrex-insulated cables are doing another big job; this time, out in the Dutch East Indies. As the life lines of electric power and control circuits on board the huge tin-mining dredges, Stuyvesant and Roosevelt, they're playing an important part in stepping up war-ravaged tin production for the world.

Out there, where supply is limited, productive dredging lays down a stiff demand: Original equipment must assure years of unfailing service! ANHYDREX cables fill that bill on this job, and they will meet many of your wiring needs with the same reliable performance. Here's why:

Anhydrex insulation is a special compound that combines low water absorption with sound electrical and physical properties. It is unexcelled for electrical and mechanical stability when exposed to water and moisture. It has high dielectric strength, low power factor and low dielectric constant. It resists sun-checking and has long life. It can be used where copper temperatures run as high as 75°C. up to 8000 volts, and as high as 70°C. at more than 8000 volts.

Cables insulated with Anhydrex can be protected by a neoprene jacket, a wire armor or metallic tape, a neoprene jacket combined with wire armor or metallic tape, or by a treated braid. They are made to meet a wide variety of applications in underground, aerial, or duct installations. You'll find them especially dependable in street, airport, park, and industrial lighting circuits; in telephone, signal and control systems; and as underground service entrance cables.

Simplex

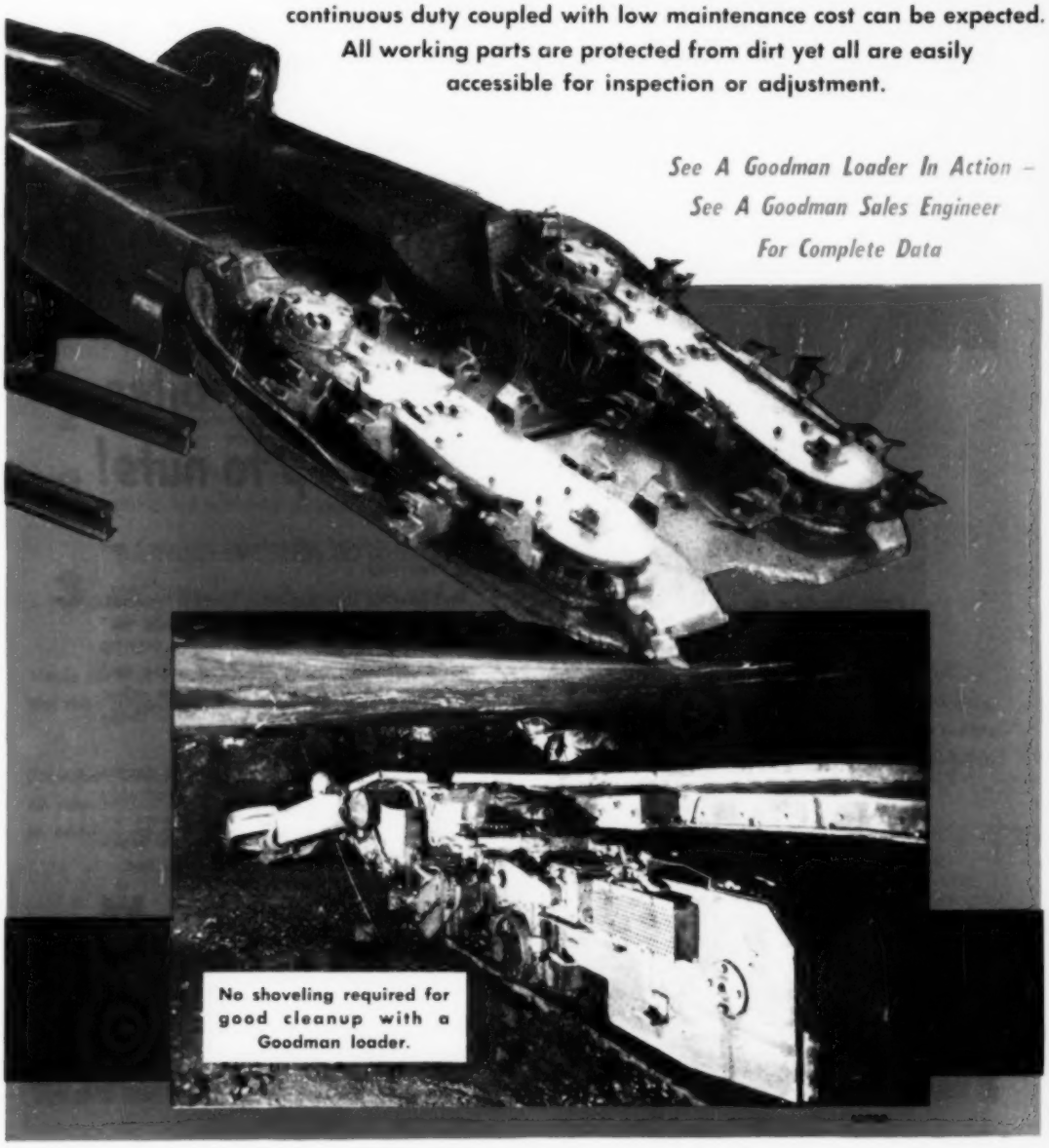
WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

GOODMAN
TRACK MOUNTED LOADERS

They're fast and with a wide side swing of front conveyor give you high capacity loading even on sharp curves and in close posting. They'll dig out "tight" coal up to 38 inches above mine bottom. Heavy, continuous duty coupled with low maintenance cost can be expected. All working parts are protected from dirt yet all are easily accessible for inspection or adjustment.

See A Goodman Loader In Action –
See A Goodman Sales Engineer
For Complete Data



No shoveling required for good cleanup with a Goodman loader.

They dish out 32-ton bites ... from scoop to nuts!

IN AN EFFICIENT strip mining operation, coal-flow schedules don't allow waste motion.

From the time coal is scooped from near-surface veins until it is washed and graded down through "nut" size in the tipple, every move counts.

That's why you see giant Internationals working here.

Their job is to keep coal scuttling, in 32-ton loads, from massive shovels to final processing. And how they do it!

If you think you see an application to *your* job, listen to this: International W models were originally developed to tote timber in rugged western areas. They are now being used in oil fields, mining, heavy construction and other operations where powerful, *specialized* trucks deliver advantages you can't get any other way.

And like all International Trucks, "specialized" is the middle name of these big "W" brutes. They range from 30,000 to 90,000 pounds gross weight rating. Diesel, gas and butane engines are available, as are other components necessary to specialize these giants for your job.

Of course there are lots of other details you'll want to check to find out how profitably these massive-muscled bruisers can work for you. Just call your nearest International Truck Dealer or Branch; you'll get the facts, fast.

Other International Harvester Products... Industrial Power
Farmall Tractors and Machines... Refrigeration

Tune in James Melton and "Harvest of Stars," CBS, Wednesday Evenings

INTERNATIONAL TRUCKS

INTERNATIONAL HARVESTER COMPANY · CHICAGO

Rome 60

DRILL CORD

IS SAFE

BECAUSE...

1 It is jacketed with tough, *flame-resistant* Neoprene.*

2 Recommended three-conductor construction provides a safety grounding conductor.**

3 The reinforced Rome 60 jacket of Neoprene resists mechanical shock, abrasion, and is unaffected by immersion in acidulous mine waters.***

Meets State of Pennsylvania and Federal flame test requirements by wide margin.

Provides grounding features in accordance with all requirements of the new Mine Safety Code in addition to clear-cut polarity identification.

Also resistant to oils, alkalies, corrosive vapors and surface checking.

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

ROME CABLE ROME, N.Y.

BOWDIL FABRI-FORGED CUTTER CHAIN

The Fabri-Forged Cutter Chain is another development by Bowdil, brought to a high degree of perfection by modern production methods, metallurgical knowledge and heat-treating practice.

Designed for maximum, trouble-free service and constructed throughout of highest quality materials, carefully selected and processed, it will give long satisfaction on all types of cutter heads and under all kinds of service conditions.

Despite its great strength and ruggedness and numerous advantageous design features, Fabri-Forged Cutter Chain is no heavier than other chains and is easy to maintain.

Used in hundreds of mines throughout the coal fields of the nation, it has set the standard for cutter chain performance and won the approval of operators everywhere.

WHY *FABRI-FORGED* CUTTER CHAIN saves time and reduces costs 6 WAYS

1. **Less Wear and Damage to Guides and Wearing Strips.** Bowdil's true-running radial track guide makes the chain circle the head at the correct angle, giving a smooth, wobble-free run that minimizes wear and prevents damage to guides and wearing strips.

2. **Extra Strength.** The drop-forged lug bodies and connectors are of equal strength . . . strong enough to withstand many times normal loads. There are no weak spots in Fabri-Forged Chain.

3. **Easy to Maintain.** Bowdil design makes removal, replacement and connection quick and easy. The simple, ingenious rivet lock principle makes it easy to remove the pin and bushing yet holds the assembly securely.

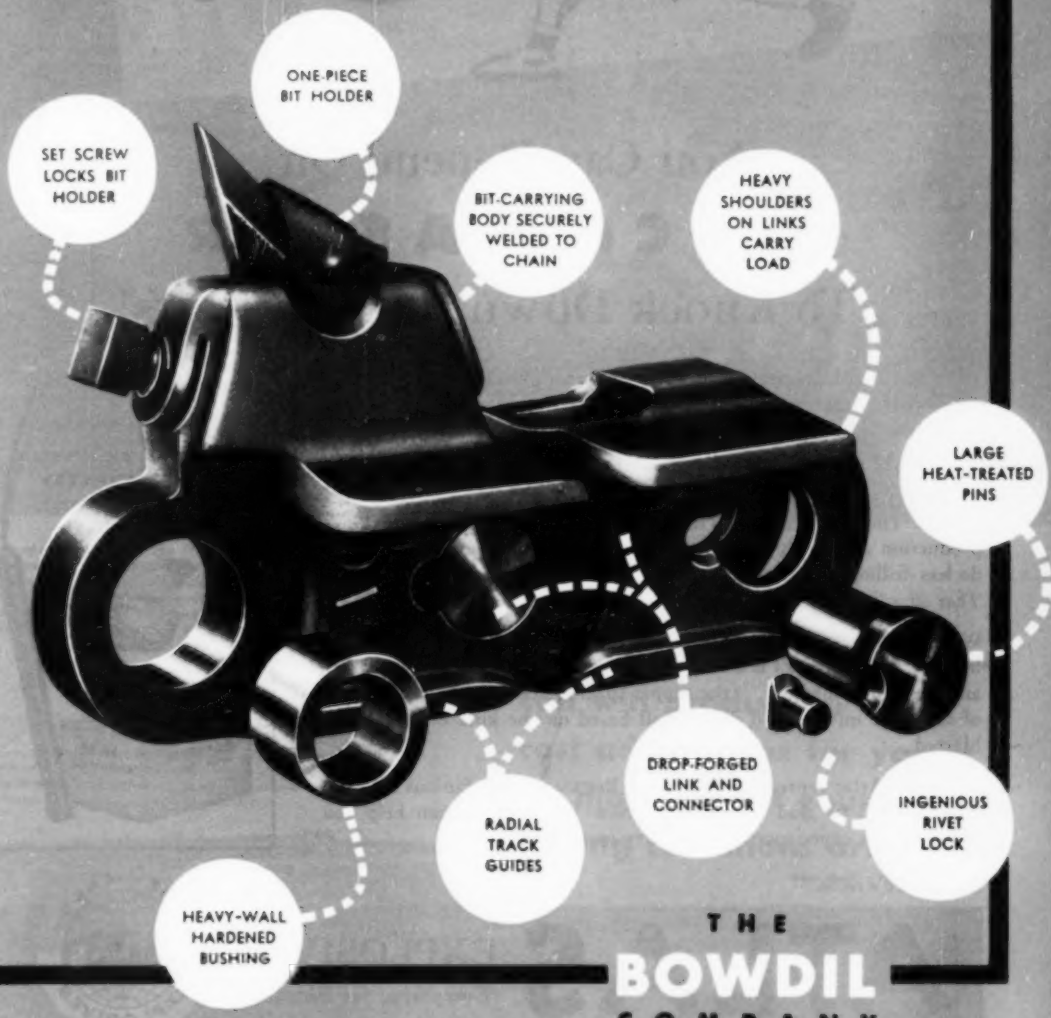
4. **Fast Bit Replacement.** Bowdil's one-piece holder wedges the bit securely in the lug projection. Individual replacement bits can be quickly and easily inserted and locked in position by means of a set screw with-

6 WAYS, CONTINUED

out removing the holder. No need to halt production for complete chain replacement when a few bits become badly worn or broken.

5. **Fits Any Job.** Bowdil's bit-carrying body is securely welded on the chain to meet any requirement for position, lacing or kerf.

6. **Long Life.** Large alloy steel pins and bushings, heat treated for maximum resistance to wear, take the wearing action. Heavy shoulders on links and lugs carry the load and shock . . . distribute stress . . . lengthen the life and increase the efficiency of the entire cutting end of the machine



THE
BOWDIL
COMPANY
CANTON, OHIO

The One-Two Punch Does It!

You Can Depend On

ROCKMASTER

To Knock Down Blasting Costs!

It's a fact that labor and blasting supplies cost more! But *over-all* costs in quarries, mines, stripping operations, and construction jobs are being knocked down through the use of the ROCKMASTER Blasting System!

One quarry with a tough blasting problem used 100 pounds of dynamite daily *for secondary blasting alone* to produce four thousand tons of rock. Then they turned to ROCKMASTER. Today they maintain their production using only eight to ten pounds of dynamite per day. They do less drilling . . . waste less labor . . . cut secondary shooting by 90%. *That all adds up to real savings!*

When Atlas pioneered ROCKMASTER it introduced a new concept of blasting. ROCKMASTER is a blasting *system* based on the right explosive and method of loading . . . the proper spacing of holes . . . the selection of the right milli-second delays—all based on the kind of rock being blasted.

Ask your Atlas representative about ROCKMASTER's famous one-two punch! He'll be glad to show you how ROCKMASTER can help *you* duplicate the experience of the quarry mentioned here.

"ROCKMASTER"—Trade Mark
Manasite Reg. U. S. Pat. Off.

ATLAS EXPLOSIVES

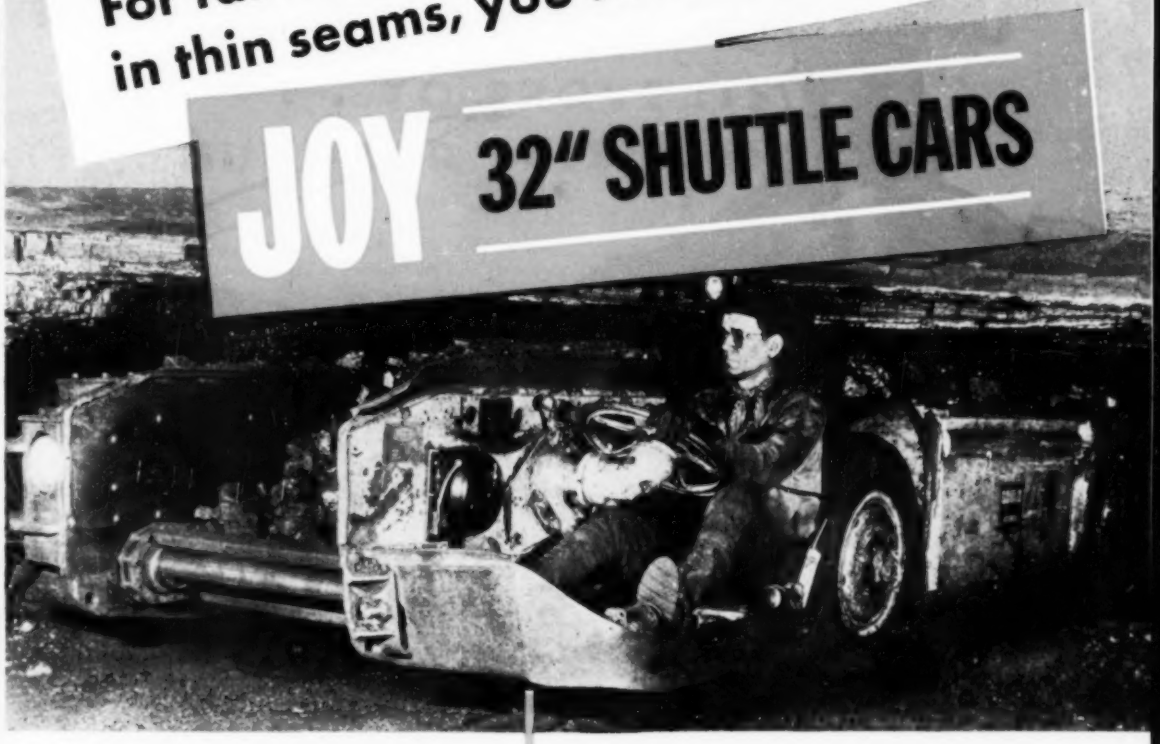
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • *Offices in principal cities* • *Cable Address—Atpowco*

For fast economical transfer in thin seams, you're ahead with

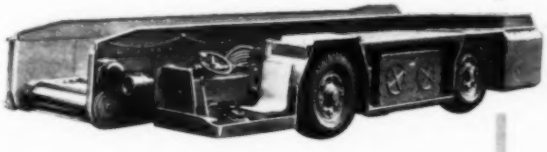
JOY 32" SHUTTLE CARS



In operation, above: the JOY 32-D Shuttle Car, battery-powered for greatest flexibility and faster tramming. Has straight discharge, mechanical steering. Capacity is approximately 3½ tons. When using in thicker seams, removable sideboards and tailboards may be added to increase capacity.

★

Below: the JOY 32-E Shuttle Car, hydraulic cable-reel type. Another 32" JOY Cable Reel Shuttle Car, the 6-SC, features four-wheel drive and four-wheel steering—makes right angle turns easily. Both may have either fixed high, fixed low or hydraulic-adjustable elevating discharge.



JOY Cutters, Loaders, Shuttle Cars and Conveyors can win production and cost advantages for you—no matter what your mining conditions are

Consult a Joy Engineer

W&J CL 2213

JOY MANUFACTURING COMPANY

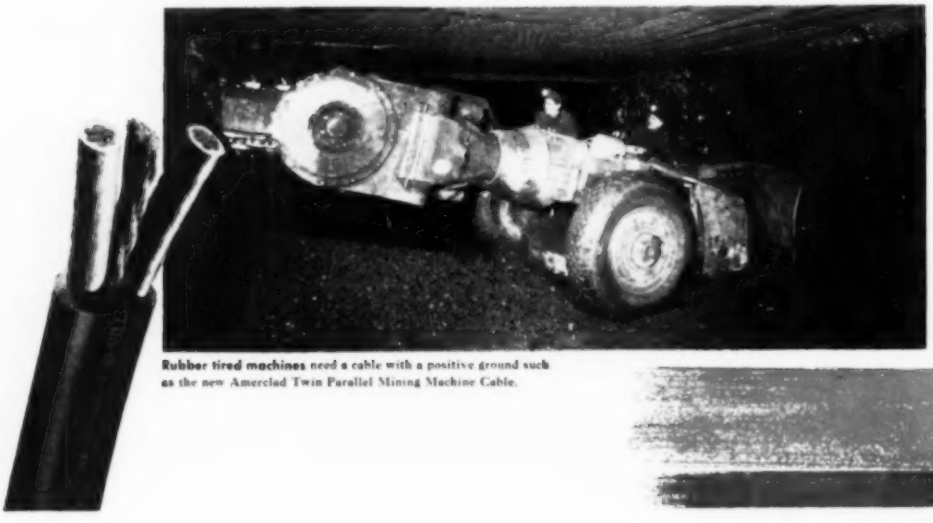
GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.

IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

THEY DROVE SPIKES INTO THIS...

PS Shielding—The black tape shown in the circle is conducting rubber and offers extra protection against shock. It also prevents corona and ozone damage to the cable.

Rugged work. This installation of Amerclad GPS Shovel Cable is more than 1500 feet long. It includes (1) a drop over a hundred-foot cliff, (2) a road crossing, (3) a drag over sharp rock and (4) a truck cross-over.



Rubber tired machines need a cable with a positive ground such as the new Amerclad Twin Parallel Mining Machine Cable.

Amerclad GPS Cable

TO PROVE ITS SUPERIOR SAFETY FEATURES

THE U·S·S Amerclad GPS Shovel Cable offers *double* protection to workmen who must handle it. In addition to the usual ground wires, each conductor is wrapped with conducting rubber tape. This is known as PS Shielding and is a development of the American Steel & Wire Company.

To test the effectiveness of PS Shielding, spikes and other metal objects were driven through the shielding and into the copper conductor without touching the ground wires. These faults invariably tripped the overload breakers showing that PS Shielding *by itself* is an effective safety measure.

The conclusion is that you can use these cheaper, lighter and smaller GPS Shielded Cables without sacrifice of the safety features of the heavier full metallic shielded Type SH Amerclad Shovel Cables.

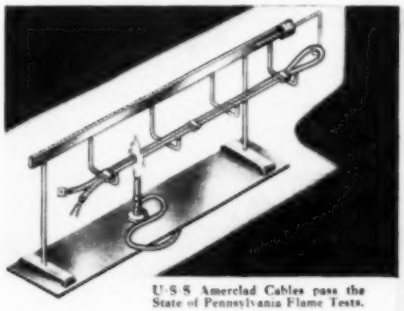
New Amerclad Twin Parallel Mining Machine Cable with flexible ground strand

This cable was especially designed for voltages up to 600 to assure maximum safety to the men who work on or around rubber tired mining machines. It has a flexible ground strand between the two conductors which provides a positive ground for the machine. The ground strand also protects any workmen who should accidentally penetrate the cable with a sharp tool.

Write for U·S·S Amerclad Booklet

The complete line of Amerclad Cables for all types of mine use are described with full details of construction.

AMERICAN STEEL & WIRE COMPANY, CLEVELAND, CHICAGO AND NEW YORK
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK



U·S·S Amerclad Cables pass the State of Pennsylvania Flame Tests.

Types of U·S·S Amerclad Cords and Cables

PORTABLE CORDS
For heavy duty electrical tools such as drills, hammers, grinders, reamers, saws, pumps, etc.
- Oil-Proof Neoprene Cords.
- Miners' Lamp Cord.
- Shot Fire Cord

PORTABLE POWER CABLES
- Type SH-D-Three-conductor Shielded Type G-Three-conductor with ground wires
- Type W-Three-conductor
- Type W-Four-conductor

MINING CABLES
- Locomotive gathering cables—single conductor
- Mining machine cables:
  - Two-conductor, Round
  - Two-conductor, Concentric
  - Two-conductor, Twin Parallel
  - Two-conductor, Twin Parallel with ground wire

MISCELLANEOUS
- Railway Utility Cables
- Motor Lead Cables
- Welding Cables
- Grounding Cables
- Traveling Cables

USS AMERCLAD CABLE
UNITED STATES STEEL

Save on maintenance costs

Simplify lubricant storage and handling

Eliminate application errors at the face

with

Gulf Mining Machine Lubricant B

—for lubrication of cutting and loading machines

Gulf Journal Oil B

—for hydraulic systems

These two Gulf quality products for cutting and loading machines offer effective help in your efforts to increase tonnage, reduce costs. Here's how!

Gulf Mining Machine Lubricant B provides better lubrication—wear in bearings and gears is reduced. Gulf Journal Oil B gives outstanding protection to hydraulic pumps—maintains system efficiency!

With Gulf Mining Machine Lubricant B and Gulf Journal Oil B you can service almost any mining machine—you eliminate as many as four lubricants. Thus your lubricant storage and handling problem is greatly simplified. And you avoid application errors at the face.

Call in a Gulf Lubrication Engineer today and ask him to demonstrate the time-saving, cost-cutting advantages of these quality products. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation · Gulf Refining Company

Division Sales Offices:

Boston · New York · Philadelphia · Pittsburgh · Atlanta
New Orleans · Houston · Louisville · Toledo

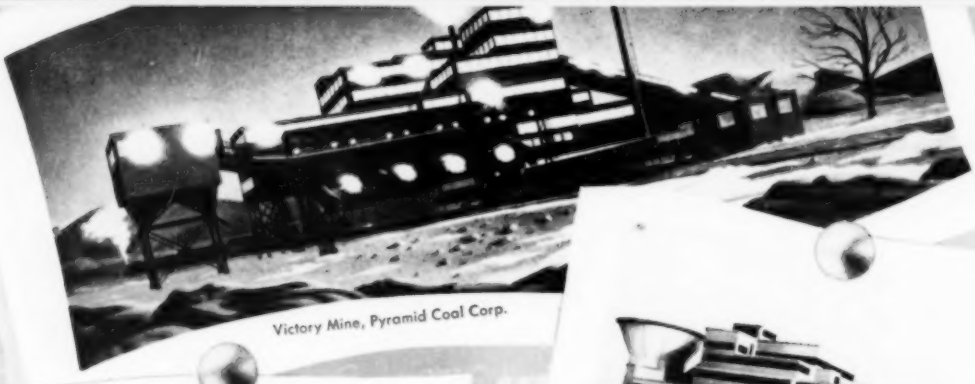
GULF INDUSTRIAL LUBRICATION

YOU'LL get more payload per pass and more passes per hour . . . step up production 10 to 50% . . . when you use a Page Automatic and use it correctly. Quick loading and immediate hoisting are the keys to big yardage. The closer the cycle of operation approaches that of a grab-bucket, the better the yardage will be. Page Automatics land in digging position, dig right in at the first pull on the loadline and get full payload within 1 to 2 bucket lengths, regardless of depth . . . 20 ft. to 100 ft. or more. With most of your operations under or near the boom end, minimum hoisting power is required.

The Page Automatic is the bucket that takes most of the "drag" out of your dragline . . . full loads in shorter distances save bucket and cable wear, reduce maintenance, minimize operator fatigue. Page Automatics are available in any size from ⅜ yd. to 30 yd. Each Automatic is guaranteed to out-dig any other dragline bucket of comparable size. For detailed information, see your construction equipment distributor, or write for Bulletin 1519.

PAGE ENGINEERING COMPANY
Clearing Post Office, Chicago 38, Illinois

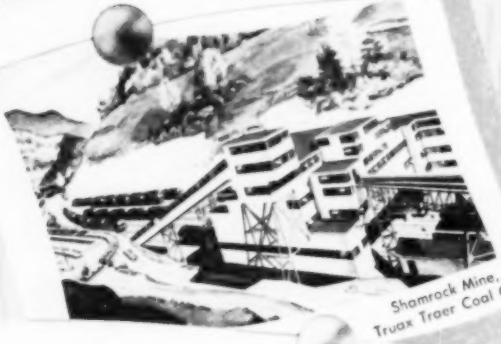
PAGE *Automatic*
DRAGLINE BUCKETS and WALKING DRAGLINES



Victory Mine, Pyramid Coal Corp.

Sentry Coal Mining Company

Caney Creek Mining Company, Inc.



Shamrock Mine,
Truax Traer Coal Co.

Tecumseh Coal Corp.

COAL PREPARATION PLANTS

Models of Architectural Design

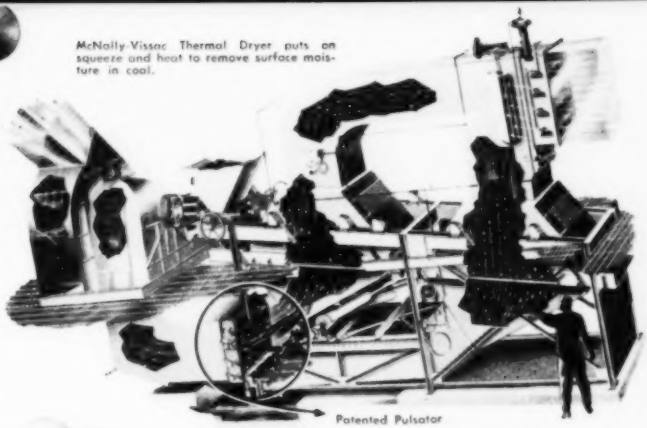
McNally-built plants are characterized by structural simplicity. Under flat-top set-back roofs, are compact cubicles daylighted by continuous sash. Expert plant layout provides labor-saving arrangements of equipment. Designs adapted to individual needs have one objective: recovery of the greatest possible tonnage of premium fuel with minimum effort and expense.

McNALLY PITTSBURG

MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

McNally Pittsburg Manufacturing Corporation—*Manufacturing Plants:* Pittsburg, Kansas • Wellston, Ohio
Engineering & Sales Offices: Pittsburg, Kan. • Chicago (1), Ill. • Pittsburgh (22), Penna. • Wellston, Ohio • Caixa Postal 1310, Rio de Janeiro, Brazil

McNally-Vissac Thermal Dryer puts on squeeze and heat to remove surface moisture in coal.



Patented Pulsator

McNally-Carpenter Centrifugal Dryer for high water removal at low operating cost.

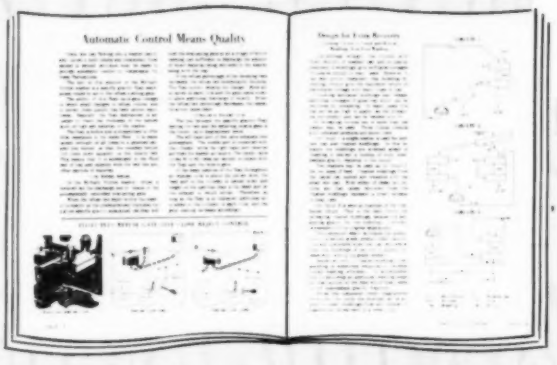
Gears Run in Oil

The new Gearmatic Stoker Coal Crusher. For the first time, an all-gear, totally enclosed, self-lubricating drive with 5-inch adjustment.

BUT...

A COAL PREPARATION PLANT IS NO BETTER THAN THE SUM TOTAL OF ITS COMBINED PARTS

The McNally-Norton Washer handles heavy tonnages of 8" to 0. Makes clean-cut separation of coal from refuse.



"Turning Your Coal Into Gold with an Efficient Cleaning System"

Send for your copy of this amply illustrated booklet, today. It's packed with interesting information about upgrading coal into the premium-price class.

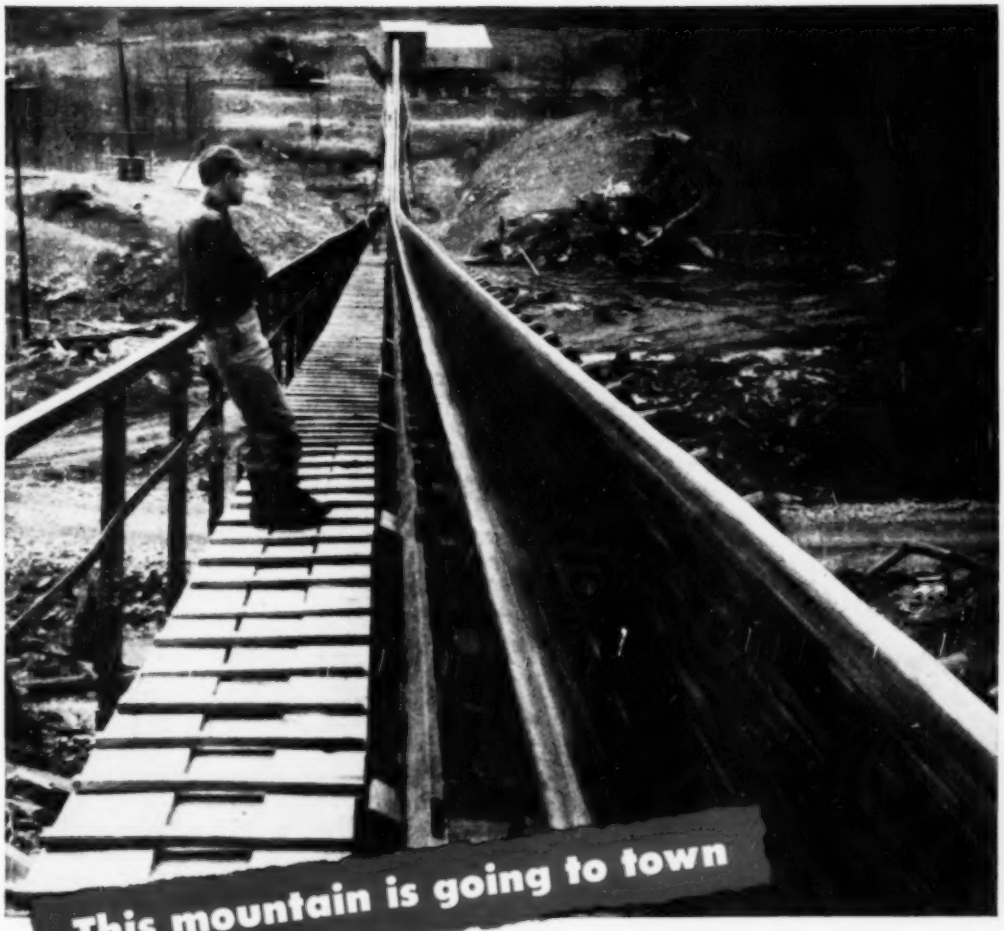
Note this difference

The illustration shows you how each wire and each strand in

Preformed Wire Rope

is preshaped to the position it assumes in the finished rope. As a result, Preformed lasts longer, handles easier, is safer to use, and saves installation time.

Take advantage of the savings Preformed wire rope offers. Ask your supplier about it. Then specify Preformed wire rope on your next order.



...ON A HEWITT-ROBINS CONVEYOR, OF COURSE

Down in West Virginia they're pulling Gauley Mountain inside out—extracting its valuable coal.

To do this, they have to bring the coal down a long slope, over a river and into a tipple nearly a third of a mile away.

Hewitt-Robins engineers designed one conveyor and belt to do the entire job. The conveyor moves the coal from an elevation of 2,565 feet to a tipple 249 feet below. *Every hour 250 tons can be carried 1485 feet at a rate of 312 feet per minute!*

To control the force of gravity on these enormous tonnages, a system of completely automatic centrifugal controls with regenerative braking was designed *to hold speeds in check and control the flow!*

Use of famous Robins One-Shot-Lubrication Idlers permitted the conveyor to be built with only *one walkway*. Triple Grease Seal and Rigid Truss Construction insure extra strength and long idler life.

Both Robins Conveyor and Hewitt Belt were engineered as a unit, with Hewitt-Robins providing a single responsibility for the entire job. All are built to the same high standards that have made Hewitt-Robins materials handling machinery and rubber products famous for over 50 years.

So whether your problem is to move materials uphill, downhill or on the level—write to Hewitt-Robins. Address Robins Conveyors Division, Passaic, New Jersey or Hewitt Rubber Division, Buffalo 5, New York.

HEWITT ROBINS

CONVEYORS

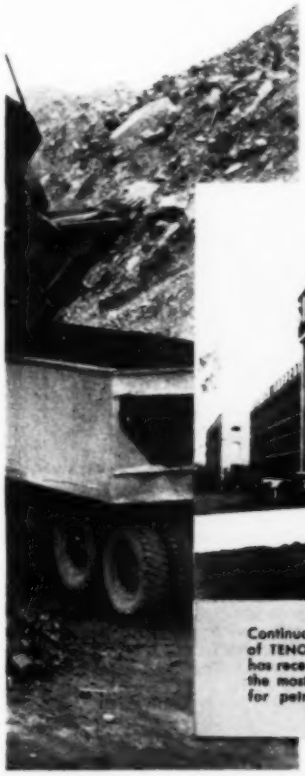
ROBINS CONVEYORS DIVISION **HEWITT-ROBINS INCORPORATED**

Ends Sludging Diesel Equipment

A major problem of diesel engine operation is the formation of sludge, gum and varnish on valve stems, rings and other engine parts, which causes engine drag, increased operating costs and frequent tear-downs.

This problem is solved by the use of Sinclair TENOL for diesel engine lubrication. Sinclair TENOL contains special Sinclair-developed additives to prevent the formation of sludge, gum and varnish. TENOL holds these harmful elements in suspension so that they are drained out with the oil at oil change periods.

Sinclair TENOL cleans as it lubricates, thus increasing time between tear-downs and lowering cost per operating hour. Try Sinclair TENOL in your equipment.



Continual research explains the high quality of TENOL and other Sinclair Oils. Sinclair has recently completed at Harvey, Ill., one of the most modern and complete laboratories for petroleum research and development.

E. W. Isom, Sinclair Vice-President in Charge of Research says: "With the new facilities now made available to us at Harvey, Ill., we expect to find many ways to help industry cut costs through better petroleum products."

HEAVY DUTY LUBRICANTS

FOR LUBRICATION COUNSEL, OR YOU MAY WRITE TO SINCLAIR REFINING COMPANY, 630 FIFTH AVE., NEW YORK 20, N. Y.

Service Ratings			
Type	Size	Pounds per square inch	
		Steam	Non-Shock Cold WOG
Screwed	⅛"–2"	150	225
	2½"–4"	125	175
Flanged	1"–2"	125	200
	2½"–4"	125	175

Fig. 709 Saddle Style — Inside Screw — Bronze Mounted or All Iron

Walworth

iron body wedge gate valves

...the last word in Dependability

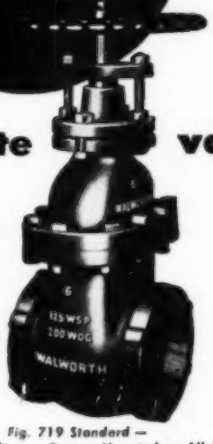


Fig. 719 Standard — Non-Rising Stem — Bronze Mounted or All Iron

Service Ratings			
Type	Size	Pounds per square inch	
		Steam	Non-Shock Cold WOG
Screwed or Flanged	2"–12"	125	200
	14" and larger	125	150

Fig. 726F Standard — Outside Screw and Yoke — Bronze Mounted or All Iron

Service Ratings			
Type	Size	Pounds per square inch	
		Steam	Non-Shock Cold WOG
Screwed or Flanged	2"–12"	125	200
	14"–16"	125	150
	16" and larger	*	150

* For steam service requiring valves 18" and larger we recommend the use of Walworth 150-Pound Cast Steel Valves.

Walworth Fig. 709 Saddle Gate Valves are recommended for lines carrying sludge, and fluids of high viscosity. They are easy to take apart, clean, and put together. They are available in either bronze mounted or all iron types, screwed or flanged ends. Two holes inside the bonnet of bronze mounted valves permit draining when the valves are open, thus eliminating the risk of damage to the valve due to freezing. All parts are designed for maximum service and strength.

Walworth Fig. 719 Standard Non-Rising Stem Valves are recommended for general service. The bronze mounted valves are furnished with bronze stems, seat rings, and disc faces. The all iron valves have nickel-plated steel stems, integral disc faces, and renewable screwed-in seat rings. Non-rising stems make them suitable for use where clearance is a factor. When the valves are open, the disc is clear of the fluid passageway.

Walworth Fig. 726F Standard OS&Y Valves are especially recommended for steam and services above atmospheric temperature. Their streamlined ports permit smooth, easy flow.

For further information about Walworth Iron Body Valves, as well as Walworth's *complete line* of valves, fittings, and flanges, see your nearby Walworth distributor, or write:

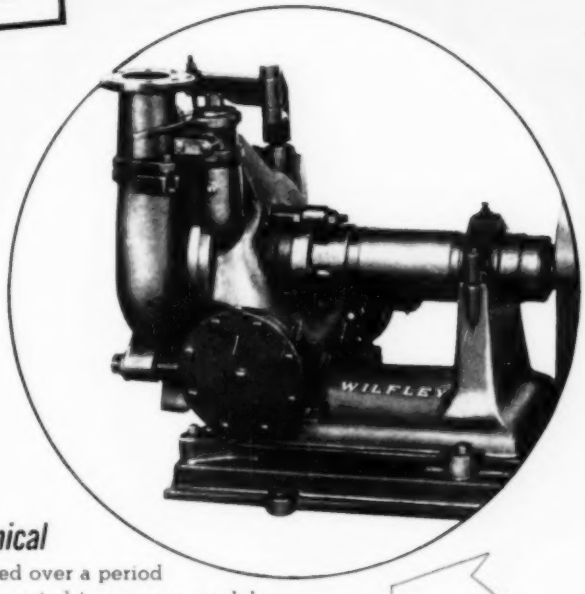
WALWORTH

valves and fittings

60 East 42nd Street, New York 17, N. Y.

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

Gives You a Definite **STEP UP** **...in efficiency**



Many new mechanical improvements, developed over a period of years, are now incorporated in our new models. These tested improvements give ever-increasing efficiency and reliability to WILFLEY pumps. Our years of experience and accumulated knowledge are now reflected in worthwhile power savings and stepped-up production. The WILFLEY design is especially adapted to the successful use of rubber. Otherwise, wear parts are made of alloy iron, alloy steel and other materials individually engineered and selected for cost-saving efficiency on your job. An economical pump-size for every purpose. Write or wire for specific information that will help reduce YOUR costs.

WILFLEY
centrifugal PUMPS

Interchangeable
RUBBER PARTS
Again Available

Buy WILFLEY for
Cost Saving Performance

A. R. WILFLEY & SONS, INC.
DENVER, COLORADO, U.S.A.
New York Office: 1775 Broadway, New York City

High-temperature insulation and jacket raise current-carrying capacity, save copper, save size, reduce cost.

Type SH-D; recommended as first choice for all high-voltage circuits requiring portable cable. Carries up to 15,000 volts.

You can get G-E insulated cable for virtually every mine application. The following types are a few of a wide range of available standard constructions.

Flat Twin with Ground Wires

A safe 600-volt cable that's easy to coil. Superior to round type in resistance to crushing. Bulletin GEA-4229.

Minepower Cable, 5000 Volts

Super Coronol insulation plus Geoprene jacket give exceptional resistance to ozone, heat, and aging. Light in weight, easy to splice. Bulletin GEA-4708.

Single-Conductor, 600 Volts

Primarily for cable reels of gathering locomotives. Steel wires stranded in conductors of sizes 6 through 1 add tensile strength. Bulletin GEA-4229.

Mine—Telephone Cable

Insulated with Flamenol; reduces interference and cross-talk to minimum. Can be buried directly. Bulletin GEA-3612.

WHY GEOPRENE PORTABLE CABLE SAVES YOU MONEY

COSTS LESS TO BUY

You save up to 19 per cent when you buy a Geoprene Portable cable. You get a smaller-size cable that costs you less and delivers the same power as a larger one.

The key to this saving is an operating temperature of 75 C instead of the usual 60 C. The higher temperature, permitted by better insulation and jacket, increases current-carrying capacity, saves copper, reduces cost.

The graph, based on 600-volt 2-conductor flat twin cable, shows how 75-C insulation reduces the cable size needed for any given job and permits a first-cost saving of up to 19 per cent.

COSTS LESS TO HANDLE

Geoprene Portable is smaller, takes less space than 60-C cable. It's lighter weight, easier to handle.

You can carry more on a reel. For example, a take-up reel on a mine locomotive holding 300 ft of 60-C cable can take up to 425 ft of 75-C cable.

This saving in weight and bulk is particularly true of the larger sizes. For example, a shovel previously requiring a bulky 4/0-awg conductor size can now be served by a 2/0-awg cable. On a 500-ft length this is a saving of 800 lb or 22 per cent.

COSTS LESS TO MAINTAIN

Your maintenance costs are lower because Geoprene* hits a new high in strength, and in chemical stability. In standard tests its tear strength is two and one-half times as high as Tellurium, our famous prewar natural rubber jacket.

In addition to this remarkable resistance to cutting action and abrasion, typical tests show Geoprene aging properties 2.05 times better than required by industry specs. And Geoprene cables are approved by the state of Pennsylvania for flame resistance.

Geoprene Portable truly offers longer life at a lower price. You can quickly get more details by calling your nearest G-E representative or by writing for Bulletin GEA-4229. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

*Geoprene—special G-E compound containing approximately 60 per cent neoprene, with the balance consisting of plasticizers, accelerators, and reinforcing agents.

GENERAL ELECTRIC

660-74

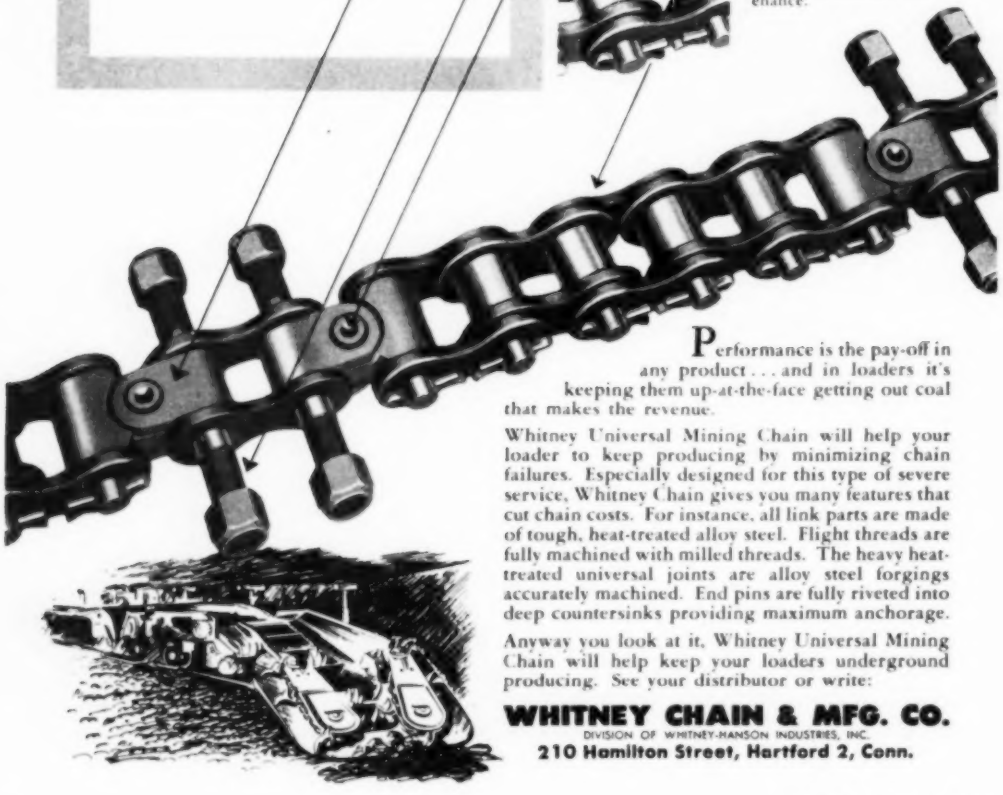
Here's the Evidence that Proves WHITNEY Universal Mining Chains Cut Operating Costs

UNIVERSAL JOINTS are constructed of steel forgings for toughness and workability. They are accurately machined for long life.

FLIGHT STUDS of alloy steel are fully machined and have milled threads. They are heat-treated for extreme toughness and durability.

END PINS of the universal joints are fully riveted into deep countersink in the forgings, providing maximum anchorage under all operating conditions.

LINK PARTS — plates, pins, bushings and rolls — are precision made from heat-treated alloy steel stock assuring long operating life with minimum maintenance.



Performance is the pay-off in any product . . . and in loaders it's keeping them up-at-the-face getting out coal that makes the revenue.

Whitney Universal Mining Chain will help your loader to keep producing by minimizing chain failures. Especially designed for this type of severe service, Whitney Chain gives you many features that cut chain costs. For instance, all link parts are made of tough, heat-treated alloy steel. Flight threads are fully machined with milled threads. The heavy heat-treated universal joints are alloy steel forgings accurately machined. End pins are fully riveted into deep countersinks providing maximum anchorage.

Anyway you look at it, Whitney Universal Mining Chain will help keep your loaders underground producing. See your distributor or write:

WHITNEY CHAIN & MFG. CO.
DIVISION OF WHITNEY-HANSON INDUSTRIES, INC.
210 Hamilton Street, Hartford 2, Conn.

LOOK TO P&H FOR ADDED VALUES

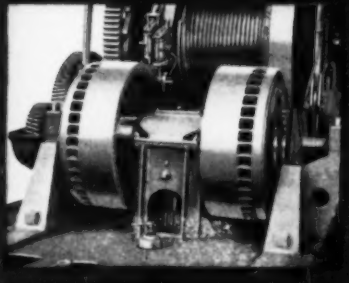
THEY'RE SWINGING

TO THE **MAGNETORQUE!**

Perhaps you've wondered why so many users are buying—and reordering—the P&H 1055. One reason for this mounting preference is the Magnetorque swing. Once you've owned a machine with it you won't be happy with anything else.

It's the greater smoothness—easier operation—greater speed—the freedom from upkeep and repairs—that will sell you the way they have sold so many other experienced users. These are extra benefits—*added values*—that make the P&H 1055 the fastest selling machine of its size and class.

If you'd like to inspect a 1055 at work, ask us to tell you where you can see the one nearest you.



P&H EXCAVATORS

HARNISCHFEGER CORPORATION

How Do Teachers Learn?

Here's how the Bituminous Coal Institute helps the people who instruct the nation's youth

Does teacher know the up-to-date facts about the bituminous coal industry? She (or he) should, but it's pretty hard to keep up with the latest developments.

To increase nation-wide understanding of our industry, the Bituminous Coal Institute advertises regularly in the magazines of the teaching profession. Through pictorial advertisements, teachers see for themselves how modern mining methods eliminate hard manual labor and increase efficiency. They learn how mechanization has helped to make the American coal miner easily the most productive in the world. They get the facts about coal miners' high wages.

To aid the teacher further, we offer two booklets—*Old King Coal Calls a New Tune!* and *Pertinent Facts about Coal*—free to any teacher who mails in the coupon our advertisements carry. So far we have given away—only in response to these written requests—almost a million such pamphlets.

A word from you may help this material reach the schools and teachers in your community. Your action will give this *national* program greater *local* impact.

other services—

Movies
Speakers Bureau Women's Club Programs
Newspaper Materials

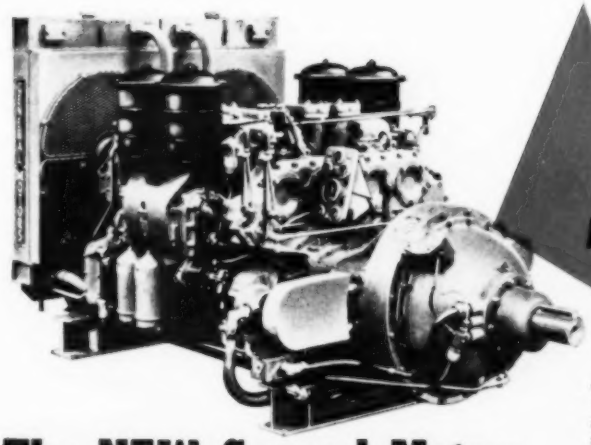
NATIONAL in scope . . .
make them LOCAL in effect!

BITUMINOUS COAL INSTITUTE

A Department of NATIONAL COAL ASSOCIATION

Southern Building, Washington 5, D. C.

BITUMINOUS COAL . . . LIGHTS THE WAY . . . FUELS THE FIRES . . . POWERS THE PROGRESS OF AMERICA

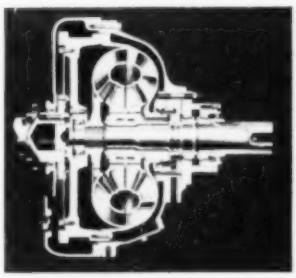


A Combination Torque Converter and Fluid Coupling *Integral with the Engine*

General Motors 71 Diesels equipped with the new GM Torque Converter take up no more space or weight than the same engines with conventional friction clutch and power take-off. Available in 3-, 4-, and 6-cylinder single engine units, Twin 4 and Twin 6 models having engine ratings from 75 to 300 H.P.

The NEW General Motors DIESEL ENGINE-TORQUE CONVERTER UNIT

HERE is a complete, integrated Diesel engine-torque converter unit that combines the inherent efficiency of the GM 2-cycle Diesel engine with the features and advantages of *both* torque converter and fluid coupling. It provides *torque multiplication up to 4 to 1* for starting variable heavy loads. It also provides *highly efficient transmission of power* during light load periods by *automatically shifting to fluid coupling* in the upper speed range.



In the new GM Torque Converter, oil does the work. Automatic transition from torque multiplication of 4:1 at stall to 1:1 in upper speed range.

A smooth, uninterrupted flow of power, delivered through a liquid, *prevents engine stalling* under any load and *protects both engine and driven machinery from sudden shocks.*

One Manufacturer—One Responsibility

Up to now most engines and hydraulic drives have been separate units. The result—compromise designs and divided responsibility. Now General Motors offers a new torque converter specifically designed and manufactured as an integral part of the General Motors Series 71 Diesel engine. It is a self-contained unit built by one manufacturer providing a long needed saving in space and weight as well as certain desirable operating characteristics not available before.

This new power unit will get the most work done in the least time because the engine operates in its most efficient speed range at all times—delivering maximum engine horsepower regardless of the speed of the load. *Maximum torque to start heavy loads PLUS maximum horsepower to keep the load moving.*

Everyone with a hard job to do in the oil fields, in construction, in mining or in logging should have all the facts about this compact, flexible GM Diesel Engine Torque Converter unit. *Write today for a complete description.*

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES . Up to 200 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS . Up to 600 H.P.

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

WHY ARE YOU IN THE COAL BUSINESS?

THE *real* reason you're in the coal business is to make money . . . isn't it?

Well, do *you* know any better way to *make* money than to *save* money?

You can save *plenty* of money with trucks that fit your job . . . Dodge *"Job-Rated"* trucks.

It stands to reason that you waste money with a truck that's too big for its job; and you're in for plenty of costly maintenance expense if your trucks are too small.

From 248 basic chassis models, your Dodge dealer can specify a truck that will be *"Job-Rated"* exactly for your hauling job.

Such a truck will have the right one of seven great truck engines . . . for top efficiency and maximum economy. It will have the right units throughout . . . to haul *your* loads, over *your* roads.

And remember . . . only Dodge builds *"Job-Rated"* trucks. Talk to your Dodge dealer!

For the good of your business—

Switch to DODGE "Job-Rated" TRUCKS

100,000 Hours

FROM ONE SET OF "SUPER-7" V-BELTS!

OVER 14 YEARS AGO, 66 complete *Texrope* drives were installed in New York's famous RCA building . . . on air-conditioning equipment for the NBC radio studios. Today, some of these *original* V-belts are still running, 20 hours a day, week in, week out!

Texrope drives were selected for two major reasons: First, they are completely noiseless and tend to dampen vibration of other parts. Second, multiple belts offer a greater safety factor, assuring service continuity. Now, after 14 years, a "bonus" of exceptionally long life has been added.

Records like this are one reason why more *Texrope* industrial V-belt drives have been installed since 1925 — when Allis-Chalmers originated the multiple V-belt drive — than any other kind.

Texrope drives offer you the widest selection of V-belt products in industry . . . V-belts, standard, adjustable and variable-speed sheaves, and speed changers.

Send for Pre-engineered Drive Manual — Lists stock components to cover 90% of V-belt drives. See your A-C dealer or District Office, or write direct for bulletin 20B6956. Also in Sweet's.

Texrope Super-7 V-belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices. *Texrope* and *Vari-Pitch* are Allis-Chalmers trademarks. A 2614

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and District Offices throughout the country.

MOTORS — ½ to 25,000 HP and up. Matching Allis-Chalmers Control.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

ALLIS-CHALMERS, 968A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

Bucyrus-Erie Bullgraders

IN THE SHADOW OF THE BIG STRIPPERS, it pays to have Bucyrus-Erie Bullgraders on the job cleaning up the cut, keeping piles in trim, maintaining haul roads . . . handling the many jobs so easy for these versatile units. With their quick blade angling and tilting feature, they handle not only straight ahead dozing, but also grading, side casting, ditching. You'll find them ideal team mates for the big excavators in getting work done fast.

Bucyrus-Erie Bullgraders are designed and balanced for use exclusively with International Crawler Tractors — engineered to apply the power of these tractors most effectively and to keep tractor maintenance low. See your International Industrial Tractor Distributor for the details. Bucyrus-Erie Co., South Milwaukee, Wisconsin.

110T48

For BUCYRUS ERIE TRACTOR EQUIPMENT See Your

INTERNATIONAL

Industrial Tractor Distributor

HEAVY-MEDIA SEPARATION

The Giant that Grew Over Night

Ready *NOW* to Help You Ship "Buyers-Market Quality" Coal

1949 is the year! Heavy-Media Separation is the process!

From here on in, only low-cost mining plus high-capacity precision cleaning can keep your coal competitive on ash, sulphur *and* price!

That means far more than mere sizing, water-washing and removal of visible slate. It means infallible separation of "pre-determined specification" coal even from near-gravity refuse by reason of the slightest difference in their specific gravities. *It means Heavy-Media Separation, the only coal cleaning process that closely duplicates "heavy liquid" results over a full size-range at any gravity from 1.25 to 3.75 . . . the only coal cleaning process that can provide automatic, continuous and complete removal of large and variable amounts of refuse without volumetric limitation.*

The proof of a process is its adoption by leading producers. As each new Heavy-Media preparation plant turns over, additional proof steadily accumulates to show that:

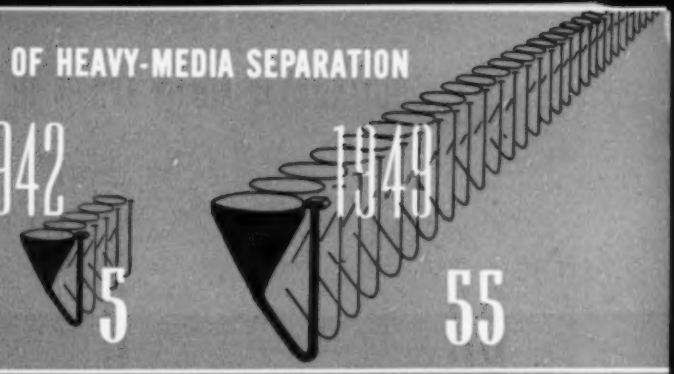
Heavy-Media Separation makes an amazingly sharp separation . . . maintains the desired separating gravity within ± 0.01 . . . never changes its separating efficiency because of intermittent feed or a sudden increase in the refuse content of raw coal. No other process even closely approximates its combination of efficiency and range of applicability!

THE REMARKABLE GROWTH OF HEAVY-MEDIA SEPARATION

PLANTS OPERATING AND BEING BUILT

1942 — 5

1949 — 55



COAL PREPARATION PLANTS

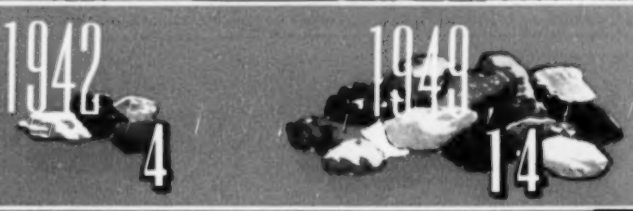
1942 — 0

1949 — 17

MINERALS TREATED

1942 — 4

1949 — 14



PLANT CAPACITY TONS PER YEAR

1948

300% INCREASE

1949

1949 is the year!

Cyanamid offers a complete range of Separation Processes by Specific Gravity Difference (Heavy-Media Separation and the Dutch State Mines Cyclone Separator) for new cleaning plants or as adjuncts to present washers.

Prefabricated Heavy-Media plants with capacities up to 125 tons per hour are available for prompt delivery and speedy erection. Larger Heavy-Media units can be quickly designed through the accumulated experience of several well-known engineering firms.

With no self-interest in equipment manufacture or plant construction, Cyanamid can give you sound counsel based on unprejudiced tests in the Cyanamid Mineral Dressing Laboratory and Pilot Plant at Stamford, Conn. We will also cooperate with engineers of your choice on plant design and provide a Cyanamid Field Engineer to tune-up your Heavy-Media or Cyclone Separator unit. Your inquiry is invited.

AMERICAN Cyanamid COMPANY

MINERAL DRESSING DIVISION

30 ROCKEFELLER PLAZA — NEW YORK 20, NEW YORK

For easy handling of coal in winter . . .

Preparation must include

FREEZE PROOFING

DUST PROOFING

CLEAN HANDLING

PERMANENT ODORLESS TREATMENT

BETTER STOKER FEED

LESS WINDAGE LOSS

with PERMATREAT Coal Spray

Unloading frozen coal from hopper cars by the use of fires, sledges and crow bars is a costly, time-consuming operation. Eliminate freezing by controlled application of Permatreat.

Permatreat makes coal easier-handling, more desirable. This means better satisfied users. Permatreat will not corrode stokers, mine cars or equipment at the tipple. Dust-proofs as it freeze-proofs.

If you are not treating at present, let Ashland help you get started. If you are treating, call Ashland on best procedure for proper application. No obligation.

Ashland
PERMATREAT
COAL SPRAY
seals in dust

ASHLAND OIL & REFINING COMPANY
Ashland, Kentucky

the home fires burning

Whether he heats an apartment house or a bungalow, almost any homeowner knows coal is the *best buy* in heating fuels. And sooner or later he's going to see cleaner, more efficient furnaces make coal an even *better* buy.

So... this business is yours for the mining—*if* your mining methods stay abreast of modern developments.

Q.C.f. Drop Bottom Mine Cars can save you *time* and *money*, by dumping a whole trip at the rate of a ton a second. The trip is not broken up; instead, it's ready to head back to the face the moment it's empty. Result—less idle loader time (that costs just as much as working time). Your efficiency goes up—your operating-cost-per-ton goes down.

Ask your nearby Q.C.f. representative to show you just how much idle loader time Q.C.f. Drop Bottom cars can save in your mine. Don't wait—call him now.
American Car and Foundry Company, New York • Chicago
Cleveland • Washington • Huntington, W. Va. • St. Louis
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MINE CARS

for Greater Mining Efficiency

Take His Advice About CLIPS

Improper use of wire-rope clips can be costly and dangerous. There's a right way and a wrong way to attach clips, and if you aren't sure which is which, the Bethlehem field engineer will be glad to show you.

First, though, he suggests you study the three drawings shown here. The main illustration shows the right way—the safest way. Note that the live end of the wire rope is not crushed or distorted, because the clamping pressure is distributed over the full base of the clip. The dead end is held by the U-bolts; thus the concentrated pressures are applied at the points of least stress.

The top picture shows how clips should *not* be attached—with the crushing pressures of the U-bolts applied to the live end of the rope, at points of greatest stress. Distortion and crushing at these points will hasten wire-rope failure and reduce the strength of the complete attachment.

The other small picture shows an all-too-frequent compromise—also wrong. Here, two of the clips are properly attached; the center one improperly. Crushing of the live end by one U-bolt creates a point of weakness. This arrangement is little if any better than that described in the paragraph above.

Just as a double-check, ask a Bethlehem engineer to look over your set-up. He'll quickly spot any clips that are not attached properly. Also, while he's there, he'll be glad to help you with any other wire-rope problems. Call for his services—they're free, and they're always available.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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in your strip mining equipment

Make your steel supply go farther — use steel that DOES more!

By replacing carbon steel with U·S·S COR-TEN or MAN-TEN where economically applicable, you can: (1) Produce as much as one-third more units from every ton of steel used. (2) Make better products — lighter, longer-lasting and generally more profitable to the user. (3) Satisfy more customers. (4) Get these benefits at little or no increase in cost per unit.

To help you use U·S·S High Strength Steels to advantage in your products, immediately—and with the least change in shop methods—we have a special staff of metallurgists and engineers thoroughly familiar with what these steels can do. Phone, wire or write our nearest office.

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That's why so much of today's *most profitable* mining equipment is being built with U·S·S High Strength Steels.

With these service-tested steels, big-name builders have found that they can obtain practically any combination of desirable properties. Strength. Toughness. Wear resistance. Light weight. High resistance to corrosion and abrasion, to shock, impact and fatigue. And in addition, superior formability, good welding properties—and low cost.

You can see the result in the fast-stepping, higher-capacity equipment that they are producing today.

If you want to increase the efficiency of *your* equipment—make it stronger, more rugged, able to do more, cheaper to operate—get in touch with our metallurgical engineers. They have had 12 years' experience applying U·S·S High Strength Steels to digging, loading and hauling equipment of all kinds. They'll gladly show you how these steels can be most economically applied to give you the best results at lower cost.

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UNITED STATES STEEL

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With Timken tapered roller bearings, close-fitting closures retain lubricants and keep out dirt. True rolling motion and incredibly smooth surface finish enable Timken bearings to operate freely, frictionlessly. Their tapered construction carries any combination of radial and thrust loads.

Timken bearings have great load-carrying capacity due to the line contact between rolls and races. They're made from Timken fine alloy steel and normally last the life of the machine in which they are used.

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Since Timken bearings were last re-rated some 15 years ago there has been such a further and constant improvement in quality that we are now able to announce a 25% increase in radial and thrust load carrying capacity. This may make possible the use of smaller bearings with savings in bearing cost, material cost and weight. Engineers will be able to utilize the advantages of Timken bearings in more applications than in the past.

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An 8-ton-per-minute schedule

DEMANDS AN 8-TON-PER-MINUTE CABLE

This Goodman Type 460 track mounted loader loads over *16,000 pounds* (8 tons) of coal per minute.

With your schedules geared to that kind of production you can't afford breakdowns.

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ROCKBESTOS A.V.C. — insulated with incombustible felted asbestos, impregnated with heat and moisture resistant compounds stands up under heat caused by overloads.

You can be *SURE* of Top Tonnage when your electrified equipment is wired with ROCKBESTOS A.V.C. Ask for it by name.

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7 REASONS WHY union

UNION-FORMED is SAFER TO HANDLE

Users report 25% reduction of lost time due to accidents.

UNION-FORMED RIDES BETTER ON GROOVES

Does not spin, twist and grind through blocks nor over sheaves.

UNION-FORMED IS FLEXIBLE

Readily bends in any direction, yet has the toughness to longer withstand jerking and other punishing strains.

UNION-FORMED IS RELAXED

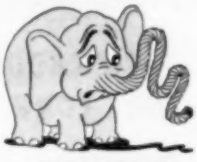
Preformed to fit their positions in the rope, strands do not fight to get out of position.

UNION-FORMED HAS GREATER RESISTANCE TO BENDING FATIGUE

Internally stress free, it resists more bends including reverse bends.

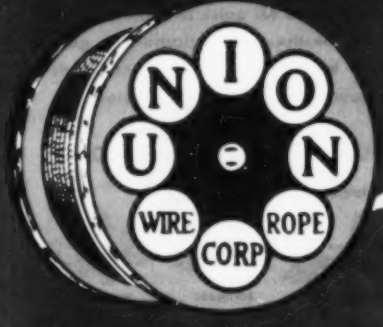
UNION-FORMED SPOOLS BETTER

So pliable it winds evenly on the drum even under a light load.



UNION-FORMED RESISTS KINKING

Forced out, the strands fight to get back into their preformed, stress free positions.



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·formed LASTS LONGER

And There are Many More Reasons Why union-formed is the Ultimate Low Cost Rope

Operators of 28 different kinds of machines give 11 other advantages of preformed wire rope such as time saved in installing, reduction of machine shut down time, easier, faster splicing and socketing, etc.

All of these performance features add up to a very important factor in wire rope buying. But the overall, major factor which influences the purchase of more and more preformed is the extra length of wire rope service it gives. From 10% to 100% longer service is reported.

Because of its longer service life, Union-formed (preformed) is the ultimate low cost rope.

For S O S (Service On Schedule) and proper wire rope application LOOK IN THE YELLOW SECTION Of Your Telephone Book For Your UNION WIRE ROPE DISTRIBUTOR.

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Let's don't lean back and say the good roads program is over the hill. Although increasing, construction contracts are only nibbling at the 2 to 4 billion dollar annual construction need. More than ever it is up to the entire highway profession and industry to plan bigger and push harder. America's ever expanding dependence upon better highways, roads, bridges and streets is so great we dare not permit a let down.

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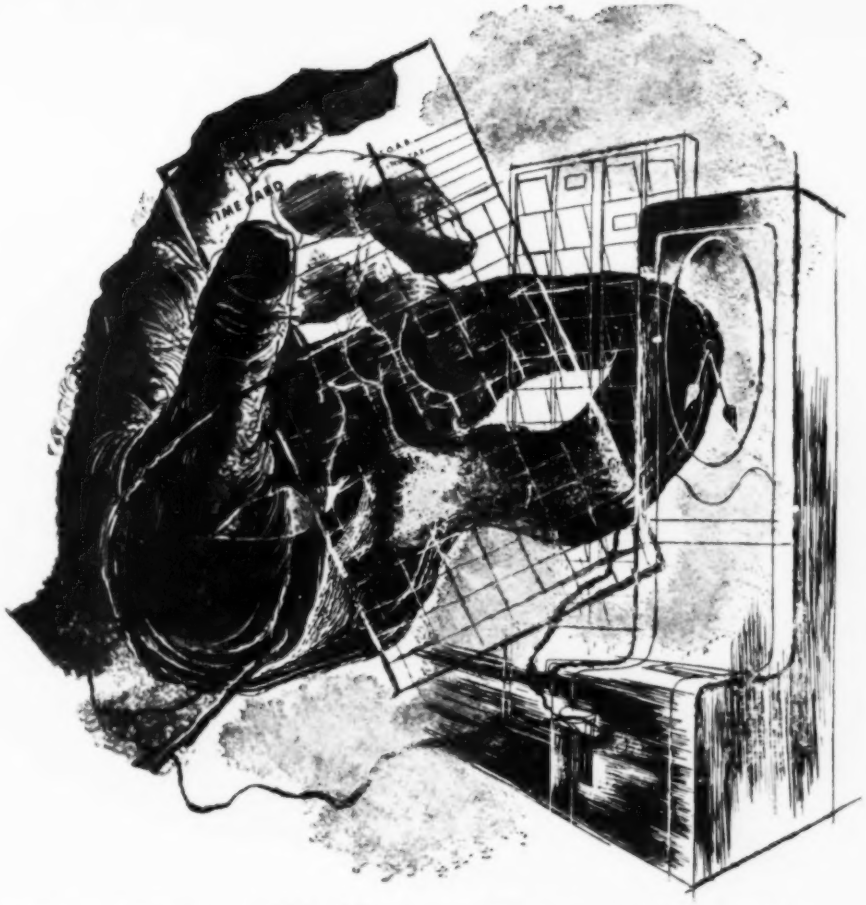

Is this PROFIT THIEF at work in your mines?

He works in hundreds of mines—choking, stifling machines, slowing production, raising maintenance expenses—costing the industry untold sums of money that *can* be saved.

You may not think he's at work in *your* mines, but it will pay you to have a look—the sooner the better.

For example . . . here are some places to look.

Are the grease guns in your mines still being filled by old-time "paddle methods"—wasting time, wasting grease, risking contamination and dirt? You've caught a suspect!

You can save 3¾ man hours for every 100 lbs. of grease and eliminate contamination risks.

Is the "man power cost" of your present lubrication method way out of line? Is it a hit-or-miss method? There's a production thief!

There is a way to save up to 23.9 man hours in applying each 100 lbs. of grease.

What about production losses from time-out-for-lubrication? What about repair and replacement costs for parts that failed? More thievery!

You can lubricate hundreds of bearings from one central point, with the right grease in the correct amount—while the machine continues to produce!

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There's one proven way to stop this loss.

An Alemite representative can tell you in 10 minutes how Alemite Methods will simplify and better organize your lubrication procedures. He can show you how mechanized lubrication from barrel-to-bearing will increase your coal tonnage and profits.

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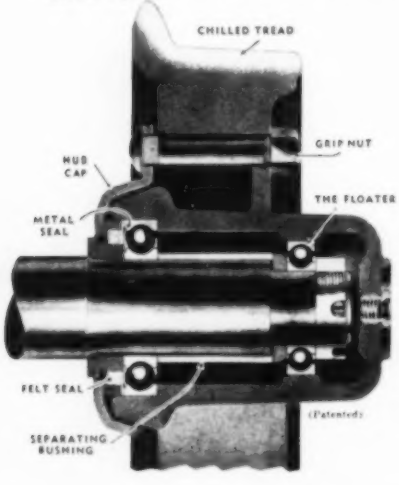
ALEMITE

MODERN LUBRICATION METHODS THAT CUT PRODUCTION COSTS

STEWART WARNER

. . you get *4-WAY SAVINGS* with the remarkable S-D "FLOATER" . . .

Note the solid closed hub in Photo 1 . . . no acid water can get in, no grease can get out. Photo 2 shows Hub Cap and 3 retaining bolts. Remove the 3 nuts and wheel slips off, as shown in Photo 3, but bearings always remain in perfect adjustment on axle . . . no pinching, no tight, no loose bearings when wheel is replaced.



In four big ways, S-D "Floater" Demountable Ball Bearing Wheels save you money.

First, in Lubrication costs. How often do you grease your present wheels? Figure it up and then balance the cost against our guarantee that you should not grease our "Floaters" more than once in 5 years. If you do, we pay the extra cost.

Second, Power Savings. Tests made by independent engineering firms have proved that smooth-running "Floaters" can increase the net loads hauled by locomotives as much as 50% over other types of precision bearings . . . a tremendous power saver.

Third, Maintenance Time. If at any time it is necessary to remove a wheel, the "Floater" can be demounted as quickly and easily as an automobile wheel. No adjustment of bearings to worry with . . . a big time saver.

Fourth, we guarantee "Floater" wheels against breakage or undue wear, as well as bearings against bearing failures for 5 years . . . your assurance of perfect satisfaction.

20 Car loads of "Automatics" from —

SANFORD-DAY IRON WORKS, Inc. KNOXVILLE, TENNESSEE

Choose the Leader . . . *For VALUE!*

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CHEVROLET From one end of the nation to the other, more truck users buy Chevrolet trucks than any other make. Chevrolet trucks offer more of what truck users want—more power combined with economy . . . more comfort and convenience . . . greater ease of handling . . . more value from start to finish! And to all these advantages you can add the biggest premium of all—3-WAY THRIFT! Here's the one truck that combines low cost operation, low cost upkeep and the *lowest list prices in the entire truck field!*

CHEVROLET MOTOR DIVISION, *General Motors Corporation*, DETROIT 2, MICHIGAN

Chevrolet Trucks alone have all these features

Chevrolet's 4-SPEED SYNCHRO-MESH TRANSMISSION offers quicker, quieter and easier operation in Series 3800 and heavier duty trucks. Faster shifting maintains speed and momentum on grades.

Chevrolet trucks have the famous CAB THAT "BREATHES"*! Outside air is drawn in and used air forced out! Heated in cold weather.

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Chevrolet Advance-Design brings you the FLEXI-MOUNTED CAB, cushioned on rubber against road shocks, torsion and vibration.

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Uniweld, All-Steel Cab Construction • Large, Durable, Fully-Adjustable Seat • All-Round Visibility with Rear-Corner Windows* • Heavier Springs • Super-Strength Frames • Full-Floating Hypoid Rear Axles in the 3600 Series and Heavier Duty Models • Specially Designed Brakes • Hydrovac Power Brakes in Series 5000 and 6000 Models • Standard Cab-To-Axle Length Dimensions • Multiple Color Options.

*Heating and ventilating system and rear-corner windows with de luxe equipment optional at extra cost.

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FIRST

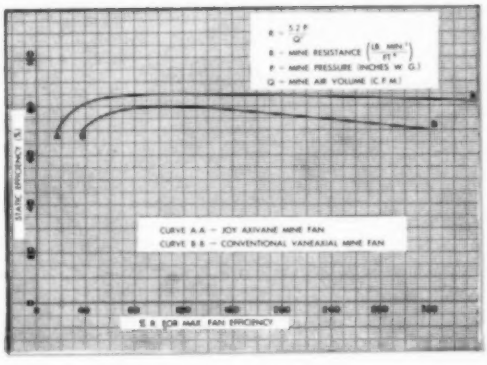
in the 5 most important Mine Fan Developments

1 LOWEST OPERATING SPEED because of its basic design

JOY AXIVANE Mine Fans are engineered to operate at peripheral speeds comparable to those of the backward-curved centrifugal mine fans which the vaneaxial fan rendered obsolete. These lower speeds reduce noise, increase service life, and permit simple grease lubrication. Compared to other vaneaxial types, JOY AXIVANE Fans actually make as many as 150,000,000 fewer revolutions per year.

2 WIDEST OPERATING RANGE due to the wide angle of blade adjustment

The performance chart illustrates the superior efficiency of JOY AXIVANE high-pressure Mine Fans for use over a wide range of mine development.



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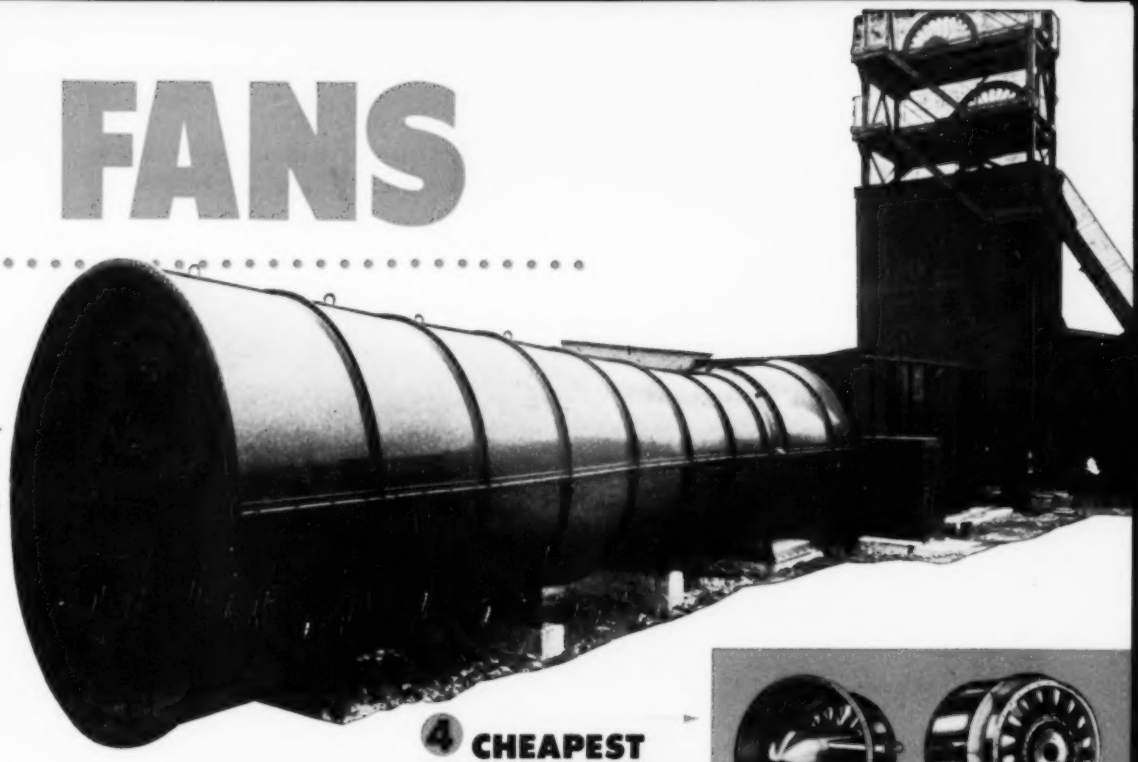
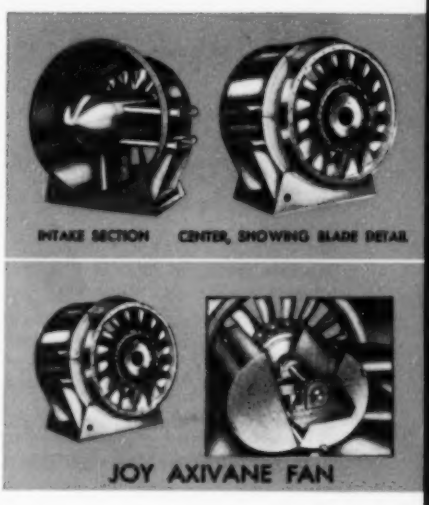
FANS



4 CHEAPEST INSTALLATION because they are complete factory assembled units

3 QUICKEST BLADE ADJUSTMENT as interlocking blades turn simultaneously

5 EASIEST MAINTENANCE due to accessibility of bearings



The five modern developments illustrated on these pages are found only in JOY AXIVANE Fans today. These exclusive features mean greater efficiency and flexibility, longer service life and lower costs. Each advantage constitutes another contribution to the mining industry, comparable in importance only to JOY'S original development and introduction of adjustable-bladed Vaneaxial Mine Fans in 1936.

● Write for data or engineering consultation on JOY AXIVANE Fans—leaders in mine ventilation.

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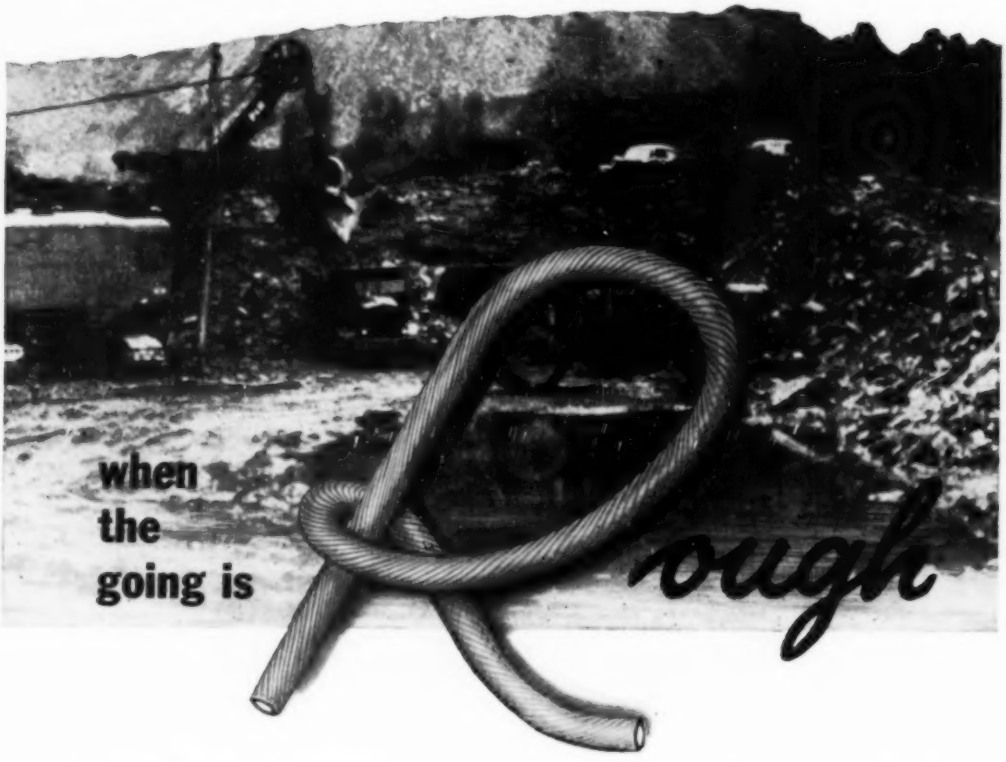
PRIMACORD makes it easy . . .



You can depend on Primacord to give you sure-fire results when the going gets rough. Branch lines down each hole initiate instantly the entire charge from top to bottom. Problems of deck loading are simplified by the use of Primacord. When you shoot, each charge *goes* with peak explosive power. You get thorough fragmentation—the kind that keeps big equipment on the move.

Primacord is flexible, easy to handle . . . it hooks up quickly with simple square knots or half-hitches. It's wound on spools that are a cinch to carry and unreel as loading operations move along. Insensitive to stray currents, it's the logical detonator to use around high-voltage electrical equipment.

There's a grade of Primacord to meet every blasting condition. Ask your explosives supplier; or write us direct. The Ensign-Bickford Co., Simsbury, Connecticut. P-21

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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

FEBRUARY, 1949

IVAN A. GIVEN, EDITOR

Firm Foundations

WARM WEATHER, a drop in overseas exports and ever-present competition, evident to an increased extent in the railroad field in particular, were the major factors in a decline of 0.2 percent in anthracite and 5.8 percent in bituminous production in 1948. Anthracite especially suffered substantially from unseasonable warmth which converted what otherwise would have been a gain into a slight drop. And in bituminous, a continued high level of business and industrial activity, marked particularly by an increase in electric-utility consumption, offset to a considerable extent declines in other directions and brought the industry through to an estimated total output of 594,000,000 tons, against 1947's record of 630,624,000.

What of 1949—and the longer-run future? Competition will continue tough, overseas exports will trend downward as European production climbs and the weather still is an unknown factor. But business activity is expected to continue at or near the 1948 level while specifically in the vital field of capital expenditures for new plant and equipment, a late McGraw-Hill survey indicates that there will be no recession in 1949. With a reasonable break in the weather, no unusual gains by competition and no serious interruptions in production, there is, therefore, every reason to anticipate a good 1949, at least from the tonnage standpoint, with a production close to or perhaps exceeding 1948 in bituminous, and ahead of 1948 in anthracite, not an impossibility.

As for the more-distant future, coal is in the best position of all to cash in on the growth in energy use in the United States. Even if there was no change in present per-capita consumption, anthracite needs in 1960, as pointed out in "Coal's New Era" in the January issue of *Coal Age*, should increase 2,520,000 to 7,400,000 tons, while bituminous needs should rise 25,200,000 to 74,000,000 tons a year. But if the growth in use of energy is taken in consideration, and if there is no change in the present relationship between coal and competition, the indications are that anthracite will have to produce 67,200,000 to 80,900,000 tons and bituminous 670,400,000 to 807,600,000 tons in 1960. However, coal already is increasing its percentage of the total fuel required for electric-power generation and there is real reason for questioning the ability of oil and natural gas to hold the pace. Consequently, coal will have to pick up the load through a further expansion in production.

But while the immediate future is good and the longer-run outlook is even brighter, coal still has some jobs on its hands. One now very much back in the picture is handling overcapacity to produce. A second—and particularly pressing at the present time—is quality. A third is price, with quality and price bringing up the problem of financing the new machinery necessary to attain the desired results in the future. Others, as in the past, are labor relations, research, merchandising and public relations.

The solid achievements of 1948, however, are assurance that trouble with these problems will decrease rather than increase in the future. With the help of manufacturers and allied coal and heating industries, real gains were made on the mining, merchandising, utilization and public-relations fronts. In addition, there was, as set out in the review pages which follow in this issue, substantial progress even in the field of labor relations, still coal's most difficult problem. As firm foundations for progress, the advances of 1948 and those planned for the future are additional guarantees that coal will remain the dominant source of the fuel and energy requirements of a growing nation.

INCREASED ABILITY TO PRODUCE reinstates protection of the price structure in a buyers' market as a major coal problem.

The Challenge of Overcapacity

Excess Capacity Again a Major Industry Problem—What the Picture Is and What Coal Can Do to Maintain a Price Structure That Will Protect the Interests of the Investor, the Miner and the Public

ONCE AGAIN, as things get back to what might be called "normal," the coal industry is faced with the challenge of excess productive capacity. That challenge was pointed up by John L. Lewis' announcement at the convention of the United Mine Workers of America last October that he would impose his own work-sharing plan on the industry if renewed price cutting threatens employment and wage rates in the future. Commenting on that announcement, the United Mine Workers' *Journal* of Nov. 1 had the following to say:

"Existing division among the coal operators, with their lack of qualified trusted leadership to cope with the industry's problems on a national basis, has forced the U.M.W.A. to be prepared to lead the way once again to stabilize operation in the eventuality the declining market for coal softens to the point where a repetition of the cut-throat competition of the '20s and early '30s is threatened."

Even without Mr. Lewis' statement and the recent behavior of the coal market, a quick look at not-too-remote history is sufficient reason for digging down to find the answers to at least two questions:

1. How much excess capacity is there now or will there be in the future?

2. What steps should the industry take to protect not only the interests of its employees but also its customers and its stockholders?

First—and closest to home—is the effect of excess capacity on the profit picture of the industry. Apparently, the relation has been fairly close in the past, as shown in Table I, which matches profit or loss in the bituminous industry with its capacity to produce. In this table, capacity is based on a 280-day year since the industry manifestly can and has averaged more than 261 days—an alternative basis of calculation—but still has not been able to achieve, at least since 1890, over 278 days (1944).

On the 280-day basis, capacity almost matched production in 1944—production, 620 million; capacity, 624 million. In 1947, production was 631 million; capacity, 755 million. The spread increased in 1948 and included a substantial rise in new deep or strip-mine production high in quality and well prepared, thus increasing the pressure on operations with lower-quality coal, little or no preparation or both. The resultant pressure on prices, accompanied by curtailment or closing of a number of operations, undoubtedly precipitated the Lewis state-

Table I—Capacity: Major Factor in Bituminous Profits?

Year	280-Day Capacity, Millions of Tons	Production, Millions of Tons	Excess Capacity Over Production — Millions of Tons	Excess Capacity Over Production — Percent	Profit or Loss, Cents per Ton
1920	725	569	156	27.4	30.4
1921	781	416	365	87.7	4.3
1922	832	422	410	97.2	*
1923	885	565	320	56.7	*
1924	792	484	308	63.6	*
1925	748	520	228	43.8	5.0 (L)
1926	747	573	174	30.3	*
1927	759	518	241	46.6	*
1928	691	501	190	37.9	5.6 (L)
1929	679	535	144	26.9	2.9 (L)
1930	700	468	232	49.3	9.6 (L)
1931	669	382	287	75.1	12.8 (L)
1932	594	310	284	91.6	16.8 (L)
1933	559	334	225	67.4	14.6 (L)
1934	565	359	206	57.4	3.0 (L)
1935	582	372	210	56.5	4.9 (L)
1936	618	439	179	40.8	3.6 (L)
1937	646	446	200	44.8	2.4 (L)
1938	602	349	253	72.5	9.1 (L)
1939	621	395	225	57.2	3.3 (L)
1940	639	461	178	38.6	0.9 (L)
1941	666	514	152	29.6	3.6
1942	663	583	80	13.7	5.3
1943	626	590	36	6.1	7.6
1944	624	620	4	0.6	6.6
1945	620	578	42	7.4	6.2
1946	699	534	165	30.9	7.3
1947	755	631	124	19.7	23.0

*Not available.

ment and a rash of news stories painting a gloomy picture of price cuts, bulging stockpiles, unemployment and mine closings.

Losses Needn't Follow

The fact that capacity has increased, however, is not necessarily a sure indication that the industry will immediately dive into red ink, or even that profits will suffer severely, though it can be accepted that the margins of the immediate past will be more difficult to obtain. Although the relationship set out in Table I has been affected to some degree, even before the war, by government controls, the figures still seem to indicate that the industry has a chance of making a profit—though a modest one—when excess capacity does not exceed approximately 30 percent. In other words, the price competition offered by an excess of approximately this magnitude apparently is not sufficient to throw the industry into the loss column.

By the same token, the fact that losses were incurred from 1934 to 1940, inclusive, in spite of minimum-price codes and legislation, indicates that even legislative price support is not sufficient to assure an industry-wide profit margin when a substantial excess capacity exists with consequent increase in the pressure to produce regardless of price.

Excess capacity, on a 280-day basis, was 19.7 percent in 1947, according to Bureau of Mines' calculations. At the beginning of 1949, on the basis of estimated manpower and tons per worker, it probably had increased to 25 to 30 percent. A further rise is a possibility in the next year or so unless the contribution of new operations still being developed is more than offset by the closing of worked-out properties and the abandonment of certain high-cost and marginal operations. While forecasting in this field is hazardous, there are indications that if any increase occurs in the immediate future it will be small, while an actual drop in excess capacity would not be too surprising.

"Excess," however, is a misnomer for at least part of the spread between actual production and calculated capacity. In normal times, coal is subject to the fluctuations resulting from seasonal variations in demand. Both anthracite and bituminous are well on their way back to normal in this respect, and anthracite is particularly susceptible not only to seasonal influences but also to the temperature average in the burning season.

In January, 1940, for example, anthracite production was 5,783,000 tons, whereas capacity in that month, prorated from the theoretical figure published by the U. S. Bureau of Mines, was around 6,900,000 tons. The excess in that month, therefore, was 19.2 percent, compared to 65.1 percent for the year as a whole. In the bituminous industry, production in January, 1940, was 44,976,000 tons, while the theoretical capacity (prorated from the 280-day figure of 639,000,000 tons) was approximately 54,300,000 tons. Therefore, the excess for the month was 21.7 percent, against 38.6 percent for the year.

Extra Capacity Serves Nation

From these figures, therefore, it can be readily concluded that a substantial part of the extra capacity at any one time is not "excess." Rather, it is capacity that must be present if the industry is to render the maximum service to its customers not only from season to season but in times when business activity or an emergency requires a rather sudden increase in output. To hark back only a little way, the extra coal-producing capacity in existence at the beginning of World War II was a real life saver.

But granting the need for extra capacity, such capacity does present the industry with some problems. Today, for example, the postwar joy ride is over, the top 50c. to $1 has been knocked off the price in many places, and some operations with poor or no preparation have had to curtail or close down. Employment and earnings also have been affected to some extent, although largely at marginal properties, where, as one Associated Press man put it in private conversation, the employees really were not miners anyhow.

Some established operators also have had to cut working time but most are still producing five to six days per week. And while prices have come down, the pattern still is characterized by firmness. In other words, quality coal with good preparation still is in good demand and consequently commands a price that should permit a profit.

What really is happening is that output is dropping to levels that reasonably could be expected after three years of postwar boom. The growth of the diesel is being felt in railroad demand, warmer weather in 1948 cut domestic use, and overseas exports were down 50 percent

from 1947 and will drop still more. However, producers of electricity increased their takings and heavy demands from the steel and chemical industry, among others, helped bituminous achieve an output of 594,000,000 tons in 1948, more than 40 percent over the 1935-1939 average, while anthracite, in spite of exceptionally warm weather, equalled its 1947 production of 57,100,000 tons.

Coal, therefore, is a long way from the threshold of ruin and, on top of that, can expect a major increase in demand for its product, with a billion tons by 1960, as pointed out in "Coal's New Era" (*Coal Age*, January, p. 58), not an impossibility.

Problem Must Be Met

Immediately, however, and perhaps permanently in view of the need for keeping extra capacity on hand for regular requirements, the industry has the problem of keeping this extra capacity from getting out of hand and from having the same effect as in the past on prices, profits, employment and earnings.

Anthracite enters the period ahead with a production allocation plan set up under state law, which plan was yielding good results in the period immediately before the war. Under this plan, it will be recalled, a committee estimates week by week the probable market demand and then allocates the tonnage among the various producers, who are expected to keep within these limits.

Bituminous coal has no such prop at present, although it is favored, if more trying times should come, by eight successive years of profits and a like period of sound business management coupled with a substantial increase in efficiency as a result of greater use of loading equipment. On the whole, capital properties—mines, machines, preparation plants, etc.—are in good shape and the industry is continuing expenditures designed to increase efficiency and quality even more. However, to continue investments on the necessary scale, it is imperative that the industry maintain a strong financial position. This will be easier as banks and people with money to invest wake up to the fact that coal is a blue-chip industry.

Finally, though public opinion is an unstable thing, people on the whole are more friendly toward coal and know more about it than ever before as a result of coal's wartime performance, the improved standing of its workers, the better quality of its product and the solid job of information sharing done by both the anthracite and bituminous branches.

All these factors add up to a strong coal industry that should be able to weather even those heavy storms predicted by the gloomier prophets. This strength, together with the probability of continuing high level of industrial activity, general business confidence in the future and the prospects for the nation's growth, are good reasons for believing that there will be no severe setbacks for coal. A majority of the coal-mining executives, as shown in the statements reported in the feature which follows in this issue of *Coal Age*, share this view. If their confidence in the future of the industry is any criterion, there will be no big bust.

This is not blind optimism, for the industry men expressing these views are, at the same time, giving serious thought to the problems ahead. Excess capacity and its effect on prices naturally bulk large in such thinking. Although conditions are not yet critical, panic price cutting could break the market, with sacrifice of profits at least one of the major results.

Price War Not the Answer

A price war and consequent loss of profits would not be the end of it. Economic stress brought on by cutthroat competition could make it difficult to continue expenditures for new plant, equipment and research on anything like the present scale, in turn hampering industry efforts to cut cost, raise product quality and expand markets. Sharpening of the divisions between operators, who, under the best of circumstances, do not always see eye to eye, and a reduction in working time and employee earnings would act further to cancel out the good done by the carefully built-up public relations programs of the past several years. And if the worst came to the worst, a renewed drive for nationalization of the industry might have a good chance of succeeding.

There is every reason, therefore, for the coal industry to seek a solution to the capacity problem. Possibilities range from Lewis' "starve-together" proposal through self-stabilization to rigid outside control over industry operations.

The Lewis formula, unless clarified and expanded, presently appears to be one of sharing available work at prevailing wage scales. It would, on that basis, protect the wage scale and give some income to all miners employed, but would do little to strike at the real root of the difficulty—maintenance of a high level of production and a price that would make it easy to assure both good wages and fair profits.

The miner naturally has a real stake in the fortunes of the industry and his interest cannot be shrugged off. But is mere work-sharing the answer? Mr. Lewis' "starve-together" expression was an accurate summary of the results if nothing more was done. Aside from that, there are other grave defects in the proposal as so far presented.

Drawbacks to Equalization

First, would customers accept the inevitable dictation over sources of supply that would follow arbitrary equalization of running time between all mines, regardless of coal character and preparation? Second, the direct effect on the industry would be to penalize the efficient mine that could offer full, or nearly full, working time and subsidize the inefficient operation. Equalizing operating time throughout the industry would keep an efficient mine and its employees from cashing in on the rewards of efficiency, make it possible for an inefficient property, or one with a poor quality of coal or inferior preparation, to keep on producing and, by reducing operating time, throw some mines that otherwise could make out into the loss column. That would be neither sound business nor good sense.

As a matter of fact, there is widespread opinion that the Lewis statement and the ensuing barrage of news stories on the dire straits of the industry were the opening guns in a campaign to gain a 30-hour week, without reduction in take-home pay, at the next wage conference. Others, however, take it as a fact that Lewis means to make an attempt at imposing his own plan on the industry, in contrast to the contrary opinion that his announcement smacks more of a challenge to the operators to put coal's house in order.

Over the years numerous proposals for protecting coal prices, wages and earnings have been offered or tried, including, even before NRA, fair-trade-practice codes. Of all these proposals, those offering the best possibilities today in-

clude mergers, minimum-price legislation, sales agencies and individual effort.

1. Mergers or Amalgamations—Experience in a number of industries has shown that where a substantial share of the business is done by a few large companies, a high degree of price stability prevails. The difficulties involved in merging coal-mining properties are well known, and in addition to those that always have existed there is the present attitude of the Department of Justice, which makes amalgamation a chancy business. Therefore, while progress may be slow, combinations or mergers are well worth keeping in mind, especially since they would in themselves act as a brake on unrestrained expansion of productive capacity.

2. Federal Minimum-Price Legislation—New federal legislation similar to past coal acts would be a "handy and legal" way of doing the job, although it would not necessarily restrain unwise capacity increases unless new provisions were added—with the danger that such provisions would be unduly restrictive. In addition, it would mean more government in business, including the possibility of more and more regimentation as time goes on. However, the fact that the last coal act materially improved the industry position had generated a lot of support for it when it was permitted to expire. Still, as Table I shows, it did not materially reduce excess capacity.

3. Sales Agencies—If given power to really stabilize prices, the sales-agency plan has undoubted merit. There is grave doubt, however, if such agencies would be given such power without special legislation in spite of the Supreme Court decision approving Appalachian Coals, Inc. It will be recalled that the court kept a string on the agency by reserving the right to reopen the case if changed conditions should convince it that such a step was necessary. In addition, the Department of Justice later took the position that conditions had changed and that any action by the agency to stabilize prices would be regarded as illegal. There is no reason to believe that the court would reject this contention if the case were reopened.

As a result of all this, sales-agency advocates have proposed new legislation similar to the Capper-Volstead and other acts affording anti-trust exemption to agricultural and fishing cooperatives. Under this plan producers would be left almost entirely free to carry on their own stabilization work, subject only to current reporting to a government agency, with power to intervene when it felt agency operations were tending toward monopoly or undue price increases. Once again, however, there would be no direct check on capacity increases, which might be stimulated by the relatively good price situation.

4. Self-Help—The chances for a new coal act or special legislation enabling sales agencies to do a similar job are speculative, but they might be good if the union got behind either one. However, there is still a fourth possibility: self-stabilization through a combination of individual and cooperative effort, the latter naturally in such fields as research, advertising and public relations, where anti-trust considerations do not apply—at least at present.

Self-Help Preserves Freedom

Self-stabilization is undeniably difficult but the rewards in prosperity, with a maximum of freedom, are well worth the effort. Briefly, the ingredients include the following:

1. Efficient operation for low cost.
2. Quality production.
3. Enlistment of the cooperation of the miner.
4. Research.
5. The best in merchandising methods and service.
6. Good public relations.
7. Careful gaging of the market.
8. Refusing to sell at a loss.

The old law that a lower cost and a higher quality are the best assurances of good business at a fair profit holds true in coal as well as in any other industry. It is especially true when excess capacity threatens or is actually in being. Efficiency involves, naturally, more efficient use of existing equipment, continued investment in new equipment and continuous study to develop better mining methods. And, since the way machines are operated has a major bearing on results, it also involves employee cooperation, gained not only through making available to them their fair share of the benefits but by increasing their understanding of their role in industry progress.

A quality product, backed up by good salesmanship and service, insures satisfied customers and, with proper research support and adequate public-relations work, a public attitude that means a better chance at a fair share of the nation's growing fuel market.

Putting the company and industry houses in order is, however, only a part—although a vital one—of the over-all problems of assuring a good price structure without resort to formal controls. A vital factor is keeping extra productive capacity within reasonable limits. The answer is a hard realistic analysis of the market that reasonably can be reached and adjustment of operations on that basis, with due consideration for future increases growing out of the expansion in energy requirements. In other words, this means proceeding on the basis of facts rather than hope.

True, this is no assurance that a neighbor will not go all out on the basis of hope and then try to make good by price cutting, but if there was general adherence to this principle, and to the principle of refusing to sell at a loss, the result should be a substantial reduction in excess capacity and in its price-depressing effects.

Selling at a Profit Vital

Refusing to sell at a loss is the final and most important factor. Following this policy requires intestinal fortitude, but is favored by the fact that even in the worst of times it is difficult for a company with a good product and a good cost to lose all its business to price cutters for any length of time. With the high level of demand now prevailing, and with the moderate excess in capacity now in existence, it is even more difficult for one operation, or even several, to take for long all or even a substantial part of the business of a neighboring or competitive group. In short, by refusing to sell at a loss, the one company, or group of companies, at least breaks even on what business still is available while the price-cutter either must come to time or go broke.

Difficult though it may be, this policy of backing up low cost and high quality with research, enlistment of miner cooperation, the best in merchandising, good public relations, careful gaging of markets and refusal to sell at a loss has a lot of advantages. First, it assures fair prices. Second, it leaves the industry and the individual free of outside regulation and in a better position to grow with the nation through better service.

CHARLES A. OWEN—Wage and hour stabilization, cooperation and more efficient use of modern equipment necessary.

JAMES PRENDERGAST—Coal quality, high cost and improved burning equipment major coal-industry problems.

J. B. WARRINER—Satisfactory year anticipated. High daily production and no increased cost burdens highly desirable.

What Coal Men See Ahead

Lower Prices, Some Overproduction and Labor the Big Questions of the Coming Year—Quality-Coal Markets Will Hold Firm—Better Labor Relations and More Machines Needed to Cut Costs and Strengthen Industry

CHARLES A. OWEN
President, Imperial Coal Corp., National Coal Association

Stabilization of wages, hours and working conditions at present levels and cooperation between employees and management with more efficient use of modern equipment resulting in increased productivity per man-hour necessary if industry is to retain its business in competition with other fuels and forms of energy.

WHITNEY WARNER JR.
President, The Warner Collieries Co., Cleveland, Ohio

Outlook good providing general business remains firm. Expansion in public-utility and chemical-industry consumption should absorb increased production from new mines. Major problems are: (1) adequate welfare and pension program for miners and exempt employees—only solution, sound actuarial basis; and (2) adequate available financial assistance for improvement of existing mines through the use of new and more efficient equipment—solution, increased emphasis on soundness of coal industry directed toward banks and other financial institutions by publications such as yours and Bituminous Coal Institute.

JAMES PRENDERGAST
Vice President, The M. A. Hanna Co., Cleveland, Ohio

Some of the major problems that the coal industry is facing for the year 1949 are indicated by the warning signs on every hand. First, there is the problem of quality. The buyer will no longer be content with a high-ash product on which the freight rate is more and more of an increasing burden. In my opinion, this will be adequately met by a majority of the producers in the coal industry.

Secondly, there is the problem of high cost. This is an important factor, with the major competitors in the energy field sinking to lower levels than have been in effect in the past year. It will be necessary for the industry to intensify its efforts to thoroughly mechanize and secure more tonnage per man. Continuous studies must be made of new and better systems of mining to bring about this result.

Third, there is the question of usability. By this, I mean the improved methods of burning coal on the part of the consumer. Improved equipment must be developed and if possible better methods be devised for turning coal into heat in order that the householder may enjoy freedom from the disagreeable side of burning solid fuels. On the other hand, the large industrial consumer must take steps to clear up the visible impurities flowing into the air, especially over large industrial areas.

The coal industry is aware of all these problems and I firmly believe that it will succeed in meeting the challenge.

J. B. WARRINER
Chairman, Lehigh Navigation Coal Co., Lansford, Pa.

The outlook for the anthracite industry in 1949 is good. The recession this fall, due to warm weather in November, was moderate and brief and did not affect demand for the principal domestic sizes. Granting normal winter weather, demand for approximate full production would seem to be assured for the first half of 1949. Exact conditions after the turn of the year are difficult to forecast due to factors not yet fully developed, such as length and coldness of winter, level of in-

L. EBERSOLE GAINES—Preparation the prime consideration; money for modern equipment the major problem.

dustrial activity, etc. In any case, anthracite being primarily a domestic heating fuel and the most reliable of such fuels, there is every reason to anticipate a satisfactory year. High daily production and no increased cost burdens are the things chiefly to be desired.

L. EBERSOLE GAINES

President, The New River Co., Mt. Hope, W. Va.

In my opinion, the prospects for coal production in 1949 are good for the standard producers of coal who are equipped to properly mine and prepare their product.

The demand has slackened to the extent of eliminating the marginal producer who is unable to prepare a suitable product. Preparation must be the prime consideration of the producer this year. The emphasis, which has been on the need for extra tonnage since 1941, has shifted and is now on quality, but it is inconceivable with the present rate of industrial activity in this country and the need for a definite amount of coal for export that those producers organized and equipped to ship a proper product will not have a steady business.

The need of the industry is greater ability to obtain equipment for production and preparation and also to be permitted a sufficient profit to pay for replacement and expansion. Depreciation and depletion figures used today by the industry itself are at least 50 percent below actual figures, and profit figures are in error to at least that extent.

The progressive trend in the industry requires capital which the industry necessarily has to furnish out of its own pocket. To my mind, that is the major problem in coal today.

PAUL W. GRAFF

President, Westmoreland Mining Co., Blairsville, Pa.

I am anxious over the possibility that excess productive capacity will materially reduce coal prices and therefore profits in 1949. Certainly many low-cost large-scale strip operations will not cease operations without a substantial effort to stay in business and their ability to undersell the present market, combined with the common desire of coal buyers to achieve lower prices, cannot fail to cause a continued softening of the market as a whole. However, the continuing high demand for well-prepared coal should enable the producers of good-quality coals to operate at some profit during the coming years even though the gross margins probably will be smaller. This is the time when a group of effective regional selling agencies could conceivably protect profit margins and prevent a decline in prices over and above the drop that is actually justified by market conditions. In other words, an effective system of coordinated marketing would make it impossible for a small percentage of excess capacity to ruin the market for the entire industry.

J. G. BRADLEY

President, Elk River Coal & Lumber Co., Dundon, W. Va.

I am not a crystal gazer as to other people's affairs or my own. In spite of business' excursions into fairyland, the principles of thrift and common sense of Benjamin Franklin and William Graham Sumner will prevail in the end and will control the coal business the same as any other.

C. O. FOWLER

General Sales Manager, Bradford Coal Co., Clearfield, Pa.

Do not sell good coal short. Major industrial problem is to obtain same. Present stocks our only fair assurance against needs when present wage agreements expire. Possible freight-rate increase and miners' dream of six-hour day may be realized, preventing any reduction in prices of good high-quality coal, therefore stops our dollars in the bank.

R. H. SHERWOOD

President, Central Indiana Coal Co., Indianapolis, Ind.

Character of manpower and condition of mining equipment better than in many years. There has been no appreciable let-down in industry and the coal outlook seems healthy next year for well-equipped mines. There probably will be some casualties among the marginal mines but there should be ample market for normal tonnage output.

J. E. BUTLER

President, Stearns Coal & Lumber Co., Stearns, Ky.

All we can say is that we are whistling in the dark.

S. B. JOHNSON

President, Lorain Coal & Dock Co., Columbus, Ohio

In my opinion, outlook for bituminous coal next year is quite favorable. There should be a steady demand for quality coal. Industry's major problems, in my opinion, will be Mr. Lewis' contemplated demands and their effect on prices; also poorer grades of coal being marketed at lower prices.

PAUL D. RITTER

President, Red Jacket Coal Corp., Columbus, Ohio

1949 coal outlook, in my opinion, very promising, particularly for good-quality, well-prepared products of established, dependable producers.

Major problems, it seems to me, are establishment of competitive prices which will hold our markets and still yield reasonable returns; secondly, establishment of better labor relationships in the industry.

The first problem involves reaching a reasonable wage basis for the industry, as well as continued mechanization for increased efficiency.

The second problem, of course, can be helped only by men and management realizing their mutual dependence on each other and working together in a spirit of reason, cooperation and helpfulness. If and when this problem is even partially solved, many other problems will clear themselves.

HUBERT E. HOWARD

Chairman, Pyramid Coal Corp., Chicago, Ill.

No intelligent forecast for coal outlook for next year can be made because no one can definitely tell what

Overcapacity and Labor—Big Coal-Mining Problems in 1949

W. J. JENKINS—Major problem is excess production; answers include improved preparation and greater use of machines.

FRED S. McCONNELL—Long-range economic studies necessary for intelligent decisions on questions confronting coal.

GEORGE F. CAMPBELL—Sound market for quality coals; capital equipment to reduce cost and heighten quality major problems.

labor, the most important factor in the cost of coal, is going to do. Hence the industry's major problem is the early establishment of a long-range and genuine relationship with labor and a clearer understanding of the problems of each side. At present, the industry's future is solely in the hands of a monopolistic union with full power to make or break it.

JOHN C. KEHOE JR.
President, Kehoe-Berge Coal Co., Pittston, Pa.

In spite of the opinions of a few so-called experts, I believe the outlook next year for anthracite coal is anything but healthy. At the present time, the anthracite industry is producing more coal than the market can absorb. This may be due in some respects to the mild weather during the fall burning season. However, the real threat to anthracite is fuel oil and natural gas. The cost of anthracite to the consumer is too high. The industry needs better mechanical equipment for the mining of coal—equipment that can reduce costs sharply and increase production per man per day far in excess of the pitiful showing of today.

E. R. KEELER
Chairman, Franklin County Coal Corp., Chicago, Ill.

It looks like coal industry next year is going to return to more normal conditions and the major problems appear to be: (1) more efficiency in production, (2) improvement in preparation, and (3) the finding of new markets. The solutions, as I see them, are (1) hard work and (2) a return to good, old-fashioned salesmanship.

GEORGE F. CAMPBELL
President, Old Ben Coal Corp., Chicago, Ill.

I look for a sound market in 1949 for quality coals. Because of the high wages prevailing in the industry, one of our problems is to provide capital equipment for the reduction of mining cost. Competition will increase the need for improving preparation by the construction of additional cleaning facilities. For both these types of capital equipment, deliveries will be slow and uncertain.

W. J. JENKINS
President, The Consolidated Coal Co., St. Louis, Mo.

Coal's major problem in 1949 will be in adapting itself to the excess production situation it faces—first, an all-time high rate of production; second, a decrease of approximately 70 percent in export to Europe; third, a decrease in railway fuel consumption due to their dieselization programs; fourth, rather heavy inroads by natural gas. These various factors represent a drop of approximately 85,000,000 tons from the tonnage produced in 1947. Much of the currently excess tonnage is produced at marginal operations, many of them dependent on brokers for an outlet for their product. The present buyers' market is not promising for the continuance of the profitable operations experienced during 1947. The Consolidated Coal Co. and producers with years of experience back of them will direct their 1949 activities toward an improved preparation of their product and or to a more extended use of mechanical equipment, having in view a lowered cost of production to tide them over the immediate readjustment period. Our plans do not anticipate any reduction of the working force.

FRED S. McCONNELL
President, Enos Coal Mining Co., Cleveland, Ohio

The year 1949 will present problems of major import to the coal industry. It is a matter of concern to me that so little attention is being paid to long-range economic studies which would reveal information upon which intelligent decisions could be made as these problems present themselves. Without such information, our decisions are bound to be hit and miss and there is too much at stake to permit uninformed action in our industry. The situations that will confront us in the coming year will demand a quickening interest in this vital and imperative activity.

H. B. CRANDELL
President, The Clayton Coal Co., Denver, Colo.

I feel that the coal industry has at least three principal problems to face during 1949.

First, competition from competi-

tive fuels and severe competition even among coal producers. Moreover, with publicity given new mining equipment and prospects of larger per-shift production, many utilities, industries and railroads will ask for price concessions while realization of lower-cost production by even the most progressive companies is still a matter of several years off.

Second, we are confronted with increased federal and state taxes covering additional social benefits, etc., and possibly irresponsible regulations covering practical operating problems.

Third, we cannot overlook our ever-present labor problems and it is only through mutual understanding and cooperation that operators can minimize many unfavorable factors.

ROLAND C. LUTHER
Vice President, Peerless Coal & Coke Co., Bluefield, W. Va.

Barring actual shooting war in 1949, I believe the coal industry will return to normalcy from the inflated plateau of the past several years. This means a return to a buyers' market, lower prices, lower production, higher quality and some lost operating time, particularly in case of poor-quality coal. I look for 1949 to bring the usual labor contract difficulties complete with shutdown, some increased federal income taxation, some improvement in delivery of new mining equipment and supplies for repair and maintenance. In general, 1949 will be a rather difficult year of readjustment in which high quality of product and high efficiency in production are again the most important requisites for success. However, although 1949 will have its difficulties compared to the past several years, it will still seem to be a pretty good year when compared to majority of peacetime years' experience in the past by the coal industry.

J. E. BOWMAN
President, Utilities Elkhorn Coal Co., Pikeville, Ky.

Briefly, I believe production will be approximately 10 percent less than in 1948; there will be a strike or two that will paralyze the industry a minimum of four weeks and a maximum of eight weeks during the year; and I think the major problem of the industry at this time is the small truck-mine producers. I have no idea as to how this problem might be solved. I firmly believe that in this territory they are chiseling on the wage scale because they are producing and selling coal below the cost of production by the major well-established companies, and there is enough of this coal to soften the market. Should there be a strike or strikes of sufficient duration to materially strengthen the price of coal, these marginal producers will be back in business by the hundreds, thereby depressing the market again within a short period of time.

L. R. WEBER
President, Liberty Fuel Co., Salt Lake City, Utah

The outlook for coal next year is, in my opinion, very good, particularly in the western part of the United States, one factor alone being the ever-increasing demand for electric power, which will, we feel, be supplied by coal-burning steam generating plants in the Pacific West and Northwest. Many other types of industrial plants are contemplating changing fuels—that is, from oil to coal—all of which spells good times for coal. Coal's major problem, I believe, is to be able to assure present and potential coal users of an uninterrupted supply. This seems to be the most difficult hurdle to overcome. The solution, in my judgment, is saner methods of bargaining that will help build the coal industry rather than destroy it.

GEORGE B. DICK
President, Butte Valley Coal Co., Walsenburg, Colo.

Impending six-hour-day contract necessitates more production per man-shift, mechanization to maintain present price level combating competitive fuels, more efficient service and cleaner coal to consumers, fair treatment by 81st Congress in any revision of present Taft-Hartley Law, cooperation by government in financing construction of hydrogenation plants to take up seasonal slumps and as a defense measure in scattered coal-mine areas.

PEARL BASSHAM
President, Harlan-Wallins Coal Corp., Verda, Ky.

Coal must be mined cheaper, have better preparation and better cooperation between selling agents in price maintenance to compete with other fuels. Industry's greatest problem today is the uncertainty of the regulation by government, the threat of higher taxation by government and double taxation by labor unions.

A. R. LONG
President, Brookside-Pratt Mining Co., Birmingham, Ala.

Shall confine my comments to situation in Alabama. The outlook for the industry here next year appears to be that the present production will continue provided no further abatement in general industrial level. Present coal production is about 75 percent of past four-year average. Our major problem is keeping costs low enough to meet competition with natural gas, diesel oil and other energies. The situation is seemingly beyond the power of the industry since mechanization where it is practical has been employed to the fullest degree in Alabama.

C. S. BISSELL
President, Black Diamond Coal Mining Co., Birmingham, Ala.

He is bold indeed who would say what the coal industry faces in the coming year. But it takes no prophet to foresee some of the problems. Wherever gas and oil are available, coal has been priced out of the market. If John Lewis expects to add further to cost by shorter hours, additional pay, increased welfare fund, further decline in demand for coal inevitable, resulting in declining prices, increased competition. The only answer I know is lower cost of production through less manpower, increased machine power.

P. L. SHIELDS
Vice President, United States Fuel Co., Salt Lake City, Utah

Coal outlook for the Far West for 1949, while somewhat less auspicious than for 1947 and 1948, nevertheless much improved over prewar prospects. In my opinion, the coal industry should fully utilize every available resource and facility to improve preparation and mining costs in an effort to partially counteract the insatiable demands imposed by labor. In my further opinion, the good of the industry demands the elimination of past district prejudices with a much greater unification of objectives, which can only be accomplished through more intensified organization.

Wide World

WORK STOPPAGE caused month-long bituminous shutdown in 1948 and spurred search for better bargaining methods.

1948: Year of Coal Progress

Coal Moves Forward on Most Fronts—Bituminous Levels Off to High Plateau, Anthracite Steady—Synthetic-Fuels Advance Highlights Year as Mining Efficiency Improves —Industry Readies for Problems Ahead

Wide World

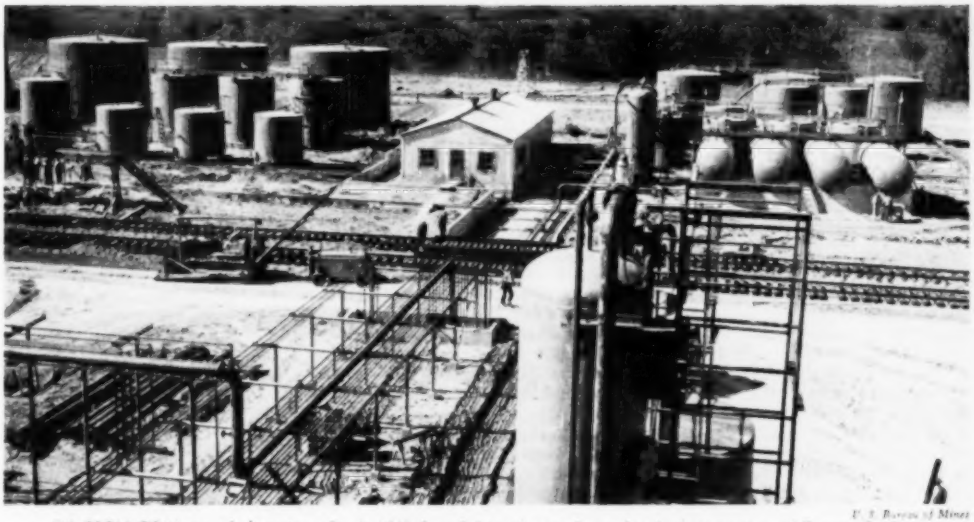
FIRST PENSION CHECKS in September marked beginning of wider benefits, hospital and medical care for the industry's workers.

A PRETTY GOOD YEAR—that is the way 1948 measured up for coal. Not so good, to be sure, as 1947, which, in bituminous at least, broke all records for production, but better by far than prewar averages and indicative of a high plateau for the years ahead.

Bituminous production in 1948 is estimated at 594,000,000 tons, only 5.8 percent less than the record output of 630,623,722 tons in 1947; anthracite, 57,052,000 tons in 1948, a decline of 0.2 percent from 1947. Strip operations during the year accounted for about 23 percent of total output, as compared with 22.1 percent in 1947.

New bituminous mines opened or placed in development in 1948, counting only those with daily capacity of 500 or more tons, added up as follows: 70 deep mines, with daily capacity totaling 150,000 tons, the highest rate of increase since before the war; 40 strip mines, with total daily capacity of 68,000 tons.

On the whole, coal-company earnings in both industries held steady to higher, fair profits being assured by increasing efficiency resulting from new machines and better equipment, especially in bituminous, plus skillful business management and more cooperation between miners and managers. This



U. S. Bureau of Mines

OIL FROM COAL moved closer to reality in 1948 through big advances by coal and oil companies and Bureau of Mines.

was reflected in an increase in per-man-day bituminous output from 6.42 tons in 1947 to about 6.60 or more in 1948. Anthracite efficiency remained about where it was in 1947—2.78 tons per man-day.

Average value per ton f.o.b. the mine increased from $4.16 in 1947 to about $4.87 in 1948 for bituminous; anthracite, $7.65 in 1947 to $8.07 in 1948. At the end of the year, however, the top 50c. or $1 was being knocked off prices in some areas as competition became sharper among operators and some marginal operations, truck and strip, were reported closing down or underselling established producers.

In both industries, there was little change in manpower from 1947, when bituminous employed 419,182 men and anthracite had 78,600 on its payrolls.

Major factors in the decline in bituminous production in 1948 were the spring stoppage growing out of the pensions dispute; a drop-off in exports from some 43,000,000 tons in 1947 to an estimated 20,000,000 tons in 1948 because of recovery in Marshall-Plan countries; a cutback in railroad consumption to an estimated 105,210,000 tons, 7.2 percent under 1947; and, toward the end of the year, a good many casualties among truck and strip mines.

A degree-day deficiency in the fall and early winter—in the East about 10 percent warmer than 1947-48 and some 12 percent warmer than normal—slowed down anthracite as well as bituminous demand and raised the spectre of overcapacity for the first time since the beginning of the war, with the result that the Anthracite Committee clamped weekly production quotas on member producers for several weeks in November and December and Mr. Lewis threatened to seize control of production and working time in bituminous if the situation weakened badly.

Added to these obstacles were others, most spectacular among them being, as usual, a labor dispute that shut down bituminous mines for about four weeks in March and April with a loss of some 50,000,000 tons and a good deal of damage to the industry's public relations. Mr. Lewis, alleging that the operators had failed to activate the pension fund, called bituminous miners out of the pits

Coal and Competition—1947-1948

	1947	1948	Percent Change
Anthracite, tons	57,190,009	57,052,000	— 0.2
Bituminous, tons	630,623,722	594,000,000	— 5.8
Crude oil, bbl.	1,856,107,000	2,012,000,000	+ 8.4
Sales and shipments:			
Natural gas, M.c.f.	2,505,748,200	2,800,900,000	+12.1
Mfg. and mixed gas, M.c.f.	597,129,900	584,000,000	— 2.2
Stokers, Classes I and II	61,596	76,600	+24.4
Residential, residential-boiler and residential-furnace oil-burner units	1,078,576	420,000	—61.1
Railroad fuel:			
Coal, tons	113,372,673	105,210,000	— 7.2
Liquid fuel, bbl.	116,959,189	123,000,000	+ 5.1
Electric utility fuel:			
Coal, tons	89,530,590	102,000,000	+13.9
Oil, bbl.	45,308,932	43,134,000	— 4.8
Gas, M.c.f.	373,053,905	401,033,000	+ 7.5

Figures for 1948 preliminary or estimates. Sources include: U. S. Bureau of Mines, American Petroleum Institute, American Gas Association, Oil Heat Institute of America, Department of Commerce, Interstate Commerce Commission and Federal Power Commission.

in an effort to force action by the operators' welfare-fund trustee. The upshot was appointment on Mar. 23 of a Presidential fact-finding board under terms of the Taft-Hartley Law, a government-ordered cut of 25 percent in coal-hauled freight movements, agreement between Mr. Lewis and Senator Styles Bridges on April 12 to pay $100-a-month pensions to 62-year-old miners with 20 years' service and, finally, Judge Goldsborough's ruling that Mr. Lewis and the union had been in contempt of court and must pay fines of $20,000 and $1,400,000 respectively.

Mr. Lewis ordered his miners back to work after he and Senator Bridges had agreed on pension terms, but final disposition of the issue was delayed until June 22, when Judge Goldsborough, ruling on suits and countersuits entered by Mr. Van Horn and Mr. Lewis, declared that the Bridges-Lewis plan was in compliance with the law and the contract.

Wage Talks Move Slowly

Meanwhile, having met bituminous operators beginning May 18 to negotiate a new wage agreement, Mr. Lewis had refused to sit down with representatives of the Southern group until ordered by the court to do so on June 7. Talks then were resumed until June 15, when Northern and Western operators walked out to protest Mr. Lewis' refusal to talk terms until pensions were activated.

The court's decision on June 22 cleared the way for resuming contract talks and on June 25, under the watchful eye of a fact-finding board, operators and the union agreed on terms of the new contract. The agreement, with only the captive operators holding out, upped the basic daily rate from $13.05 to $14.05, doubled the welfare-fund take from 10c. to 20c. per ton and carried over vacation, overtime, union-shop and the "able and willing" clauses. Anthracite operators signed substantially the same contract July 4.

Through the good offices of Judge Goldsborough, agreement was reached July 14 on the union-shop clause, to which the captive operators had objected, and 50,000 captive miners who had stayed at home at the end of the miners' vacation period returned to work.

In some industry quarters, as well as outside, there was strong feeling that the disputes prior to agreement could and should have been settled without interrupting production and with some benefits to the industry's public standing if both sides had showed more interest in constructive analysis of the industry's real problems and less interest in airing their differences in newspaper headlines.

At any rate, the miners' gains were substantial, whatever the cost to the industry and its customers. Under the new wage scale, bituminous miners in October averaged $1.979 per hour and $76.40 for a 38.6-hour week; anthracite, $1.905 per hour and $73.74 for a 38.7-hour week. In bituminous, this was $1.56 a week more than weekly earnings in March, 1948, when miners averaged 40.3 hours. In anthracite, workers actually earned $2.15 per week more than they had earned in March, when they worked 40.6 hours.

In addition to their wage gains, miners also began to share the benefits of their enlarged health-and-welfare fund. In a ceremony in Washington Sept. 9, Mr. Lewis handed over the first $100 monthly pension payment to a retired miner, while the union's welfare program got going with medical treatments for paraplegics and others, blueprints for new hospitals and medical centers and the announcement of a new treatment that promised a cure for silicosis.

Another big obstacle for coal in 1948, in addition to labor disputes, was the growing strength of old competitors, oil and natural gas. Although oil-industry spokesmen as well as outsiders, looking back in the spring and summer at the fuel crises of 1947-48, predicted similar shortages for 1948-49, the industry drew on all its strength, spent close to $3,000,000,000 for capital improvements and expansion and pushed production up to 2,012,000,000 bbl., 8.4 percent above 1947. In fact, with increased output and a warm autumn, oil stocks were more than adequate at the end of the year, causing some softening of retail fuel-oil prices in scattered areas and leading two large companies in the Southwest to withdraw a 35c.-per-barrel premium offered for about three months following September. Thus coal's price advantage in some markets was whittled down and, looking at the improved availability of fuel oil, some coal users were persuaded to switch over to oil.

However, serious questions about oil's long-range future still were unanswered by the industry's growth. Spokesmen admitted that the industry could be expected to do no more than keep pace with growing demands for the next five years and that stepped-up military needs, in the order of 2,000,000 bbl. per day asked by Defense Secretary Forrestal, would mean severe cutbacks in civilian use and further reliance on remote sources in the Middle East and South America or on synthetic-fuels production on a huge scale. In fact, the nation's marginal position was emphasized in our becoming a net importer of oil in 1948 for the first time since the early '20s, when nearby Mexican fields provided large quantities.

Natural-Gas Threat Grows

On the natural-gas side, production rose to an estimated 2.8 trillion cu.ft., up 12.1 percent from 1947, and the industry listed 12,242,500 customers, a gain of 13.3 percent over 1947. Meanwhile, new capacity and new pipelines reached farther and farther from major producing fields to serve homes and industries in the East, the Southeast and the upper Middle West. At the end of the year, the industry reported 19,000 miles of pipeline in service and 3,500 miles either just completed or under construction. The two longest lines planned were an 1,800-mile stretch from the Rio Grande Valley to New York and a 1,500-mile haul to four states in the Southeast. Expanding capacity was typified in Federal Power Commission authorization for an increase of 75,000,000 cu.ft. daily through the Big and Little Inch lines, bringing total capacity to 508,000,000 cu.ft. daily.

With wider availability, a price range that enabled it to compete with oil and coal in many areas and a backlog of proved reserves indicating a 30-year supply, it became clear to many coal men that natural gas soon might become coal's most dangerous competitor. However, bigger demands by new chemical industries close to major gas fields increased the danger of short deliveries to far-away customers and threatened to slow down the rate at which gas was reaching the distant markets.

Allied with natural gas and oil in competition with coal, another fuel, liquid petroleum gas, made significant advances in 1948, with an overall 29.5 percent increase above 1947 to a total of 2,600,000,000 gal., 1,540,000,000 gal. of which went to home customers for cooking, refrigeration, home heating and hot water.

Thus, coal's rivals gained a good deal of strength during the year. However, there was little reason for coal men to feel despondent over the outlook, either long-range or short-range. Hopeful signs of coal's strength in 1948 were reflected in an increase of 24.4 percent in sales of home-size stokers and a corresponding decrease of 61 percent in sales of residential oil burners. Likewise, while the use of oil by electric utilities dropped 4.8 percent, coal consumption moved up 13.9 percent to 102,000,000 tons in 1948 and the power industry's long-range plans showed a need for at least 4,200,000 additional tons each year for the next 12 years. Addition of about 1,800,000 tons of annual capacity by the steel industry in 1948 added further strength to coal's position and, with still more capacity under construction or planned, improved the outlook for the years ahead.

Coal Progress Spurred

Coal, although it cashed in on the opportunities offered by a high level of business and industrial activity in 1948, was not content merely to go along for the ride. Aside from improving the supply of stoker coal and sending more tons of mechanically cleaned coal to market, thus giving customers better value for their fuel dollars and strengthening the public's good opinion of the industry, coal also beefed up its program for merchandising and advertising, public relations, research, mine safety and manpower training and recruitment; sought for ways to improve its labor relations locally and nationally; and took steps to brace itself against a time when supplies and equipment might be allocated and coal demands sharply increased under the threat of war.

On the bituminous public-relations and merchandising front, 1948 was marked by steady growth of Coal Heating Service to a total of 53 groups with 1,487 participating retailers in 21 states; over 250 requests for showings of Bituminous Coal Institute's film, "The Magic of Coal"; a flood of requests for information and pamphlets, directed at B. C. I. from teachers, civic groups and women's clubs; publication of *Bituminous Coal Facts and Figures* and *More Capital Equipment—Coal's Foremost Need* by B. C. I.; increased activity by the Speakers' Bureau; the appointment in November of an air-pollution committee by the National Coal Association; and continued radio broadcasts of the industry's Washington program, "Congress Today."

In addition to the industry-wide public-relations activities, individual bituminous companies and producer groups also were busy along the same lines. To mention only a few, Appalachian Coals, Inc., continued its regular radio broadcasts from Cincinnati to promote coal and publicize the facts about the industry; Hanna Coal Co., St. Clairsville, Ohio, lent a hand in setting up community recreational centers and announced plans to build $1,500,000 worth of modern homes to sell to its workers; and strip-mine operators in western Pennsylvania, with help from the state Department of Forests and Waters, organized a land reclamation school to help operators plan the best use for mined-out lands.

In anthracite, the year was marked by a well-planned industry-wide advertising campaign, budgeted at $650,000, to tell the public about anthracite's merits as a fuel and about new equipment available for better burning. To mention only one company, The Philadelphia & Reading Coal & Iron Co., Pottsville, Pa., used radio, direct mail and paid newspaper space to tell miners and the region's citizens about the company and the industry. Like bituminous, anthracite also organized a land-rehabilitation school for strippers to improve stripped properties. Finally, the Anthratube, employing altogether new principles of feeding, burning and ash-removal, gave a big boost to anthracite marketing and public relations when manufacturers swung into full production toward the end of the year.

In research, anthracite and bituminous made big forward strides in developing, improving and testing burning equipment. Bituminous Coal Research, Inc., for example, supported by 16 major railroads and 322 coal and coal-land companies and a budget of $539,300 for 1948, completed development of three new coal burners—a small radiant heater, a larger circulating heater and a full-size furnace, all of which are magazine-type, burn any type of coal without smoke and require only infrequent firing; published several studies on smoke control and better firing methods; and sought new uses for bituminous on the farm and in industrial plants.

The Anthracite Institute, meanwhile, found wider uses for anthracite as an industrial fuel, both pelletized and powdered, investigated a method for gasifying silt in a boiling combustion bed, erected a pilot plant for pelletizing silt and completed some basic improvements in burning equipment.

Substantial headway was made in two industry-wide bituminous research projects, which, though more narrowly focused, promised long-term gains for the industry and its customers. The Locomotive Development Committee of B. C. R. moved closer to its goal of a coal-fired gas-turbine locomotive and, though progress was slower than had been hoped, coal men nevertheless were assured of a coal-burning locomotive that eventually would challenge and beat the diesel, thus recapturing a good share of the railroad market lately snapped up by the diesel. To help this project along, the U. S. Bureau of Mines announced, in the fall, the loan of a 40,000-c.f.m. turbine, once destined for Russia under lend-lease, to the Locomotive Development Committee.

Seek New Mining Machine

In another research project, that of cutting the cost of mining coal, the Mining Development Committee of B. C. R., with a $250,000 budget fully subscribed, got under way with the appointment in August of a skilled design engineer to direct the development of a new-type machine that will cut coal out of the solid and load it directly into cars or onto conveyor belts.

Individual companies and associations also took a hand in research. To mention only two, the Western Pennsylvania Coal Operators' Association announced in December a joint project with the Mellon Institute to study the causes, control and prevention of gob fires, and the Lehigh Navigation Coal Co. announced the development of a new aggregate material, made of slate and other wastes, for use by building and highway contractors.

Doubtless the most newsworthy research projects of the year were those covering synthetic fuels and coal utilization. On Nov. 15, Pittsburgh Consolidation Coal Co., in cooperation with Standard Oil Development Co., opened its new $500,000 pilot gasification plant to inspection by railroad, coal-company, electric-power and union officials. The new plant, together with other facilities near by, marks one of the company's early steps in a long-range plan to ready itself for a national need and to establish new markets for coal. The end result may well be syn-

thetic liquid fuels made from coal. However, in moving toward that end, the company will develop new methods of producing as well as using gas and will continue its exploration of coal carbonization and tar processing. Earlier, on June 3, Koppers Co. and Gulf Oil Co. announced that they had joined resources to study coal gasification and the development of synthetic liquid fuels.

Oil From Coal Nearer

However, for the lion's share of synthetic-liquid-fuel development, the U. S. Bureau of Mines was responsible. With a $30,000,000 appropriation from Congress in March, 1948, the Bureau advanced work that already was started on coal gasification above ground at Morgantown, W. Va., and underground at Gorgas, Ala., this latter project being a joint undertaking with the Alabama Power Co.; dedicated hydrogenation and Fischer-Tropsch pilot plants, costing $3,500,000, at Bruceton, Pa.; brought a $7,000,000 hydrogenation demonstration plant close to completion at Louisiana, Mo., and finished construction of the gasification unit for a Fischer-Tropsch demonstration plant at the same location; and planned a $750,000 plant at Grand Forks, N. D., looking to the mining, preparation and uses of low-rank coals and lignite. All this activity was aimed at the time when coal, in peace or war, may be called on to shoulder a much bigger share of the nation's energy needs. As the year ended, the Department of the Interior was reported ready to ask Congress for $800,000,000 to get a synthetic-fuels industry started.

In its relation with the government, the industry fared pretty well, past years considered. To be sure, the Bridges-Lewis agreement on pensions and the sidelines watching of a fact-finding board during wage talks could be viewed as a symptom of governmental eagerness to step onto the stage. Yet the Taft-Hartley Law gave the industry a leg to stand on in its disputes with Mr. Lewis and, it must be admitted, Judge Goldsborough's role gave fair treatment to all parties. Even the military draft was no great threat to coal, with the prospect that no more than 0.5 percent of the industry's manpower would be called into uniform before the middle of 1949 (*Coal Age*, October, 1948).

Although Mr. Lewis spurned Interior Secretary Krug's invitation to join in forming a Bituminous Advisory Council at the first of the year, the industry's leaders went ahead without him and by the end of the year had chalked up some real accomplishments, including, in the places where they counted most, a statement of the industry's steel needs, a plea for more coal cars and faster delivery of mining equipment and a request for studies looking to better utilization of coal, particularly where it can serve as well as oil, a speed-up in the synthetic-liquid-fuels program, a reappraisal of coal reserves east of the Mississippi and a program for conservation and better preparation. Having a group like this to state the industry's case in Washington was some assurance that, if war should come, coal would be well represented in the scramble for scarce materials.

Along the lines of the Advisory Council's recommendations, it was announced in August that the U. S. Bureau of Mines would undertake a survey of coking-coal reserves in the East and, later, that the Bureau would lend a 23,000-c.f.m. gas turbine to be used in connection with underground gasification experiments at Gorgas, Ala. Meanwhile, the Bureau, together with Army engineers, began a survey of coal resources in four areas of the country as part of a search for synthetic-fuel raw materials, began a $396,000 study of anthracite mine-water problems and started construction of a new anthracite laboratory costing $450,000 at Schuylkill Haven, Pa.

Freight Rates Advance

If there was a dark side to government relations, it was in freight-rate increases granted by the Interstate Commerce Commission and resultant increases in the delivered price of coal. In April, the ICC canceled two previous interim increases granted in 1947 and boosted coal rates 20c. to 34c. per ton, depending on the mine price. Later, in August, previous increases granted since Oct. 13, 1947, were canceled and a flat 20 percent boost was allowed, with a maximum increase of 40c. As the year came to a close, the railroads asked for a further increase of 40c. per ton, 30c. of which was requested immediately pending full hearings.

The industry's relations with state governments were spotty, the most substantial gain being made in Pennsylvania, where the legislature earmarked $5,000,000 for a long-range project to clean up the Schuylkill and other rivers. Work got under way in the summer. Elsewhere, as well as in Pennsylvania, drives to regulate stripping met with varying success. A Pennsylvania statute empowering counties, townships and municipalities to tax almost anything not already taxed by the state bred confusion, with some levies being upheld by the courts, others being scaled down and still others being rescinded. In Kentucky and Ohio, as well as in Pennsylvania, intelligent organized action by strippers led to the voiding of some regulatory statutes and failure to write other proposals into law.

Local Labor Scene Quiet

Locally, the labor-relations picture improved over 1947, with fewer wildcat stoppages and less local bickering. In scattered areas in the Southern fields, to be sure, there were some disturbances growing out of union efforts to organize non-union operations by strong-arm methods and elsewhere local stoppages halted production temporarily. However, new muscle in coal-company programs to train men, reward merit and share the facts seemed to be paying off in labor stability. Company magazines picked up a good deal of life during the year and company-sponsored field meets, picnics and other outings, reaching not only employees but also their familes and neighbors, added good will and community spirit to mining-town life.

Typical of company merit awards was the plan of Lorain Coal & Dock Co., which included distinguished service awards, complete with certificate, gold pin, banquet and free life insurance, for employees with perfect on-the-job attendance records. Several companies—Lorain Coal & Dock Co. and Lehigh Navigation Coal Co., to mention only two—set up retirement, medical and hospitalization plans to protect salaried employees and others not covered by the union agreement. The results promised to be less personnel turnover and a better cooperative spirit between company and men.

The industry's manpower recruitment and training program got a big boost during the year through the Vocational Training Department of the National Coal Association, with visits by the director to public schools and engineering colleges throughout the country and with publication of a guide to engineering colleges for

use by high-school teachers in advising youngsters about college education. Likewise, individual coal companies and associations maintained or enlarged their scholarship programs to encourage young men to study engineering and, in some instances, to give sons and daughters of employees an education along lines of their own choice. Joining in these efforts were the following, to mention only a few: Johnstown Coal & Coke Co., Princess Elkhorn Coal Co., Red Jacket Coal Co., Old Ben Coal Corp., United States Fuel Co., Illinois Mining Institute, West Virginia Coal Operators' Association and Indiana Coal Producers' Association.

Joint Efforts Speed Training

On-the-job training for miners, aimed at increasing efficiency and safety and building up a reserve of men qualified for supervisory positions, also went on at a steady pace in 1948. This was particularly true in Pennsylvania, West Virginia and Kentucky, where state agencies and the Bureau of Mines joined local companies in vocational and safety training programs, often with the help of the union.

Typical of the share states took in safety promotion was the allocation by the governor of West Virginia of $30,000 in May to further the coordination of state and federal safety work, making possible the employment of seven new field inspectors, an enlarged office force and more first-aid training. Again, as they did in 1947, operators and the union in the Beckley, W. Va., field joined in an intensive summer safety drive. Meanwhile, industry-wide safety work went into high gear with the organization of a Safety Division within the National Coal Association and the appointment in February of an experienced director to promote training, better mining conditions and recognition for safety results.

Thus, all in all, 1948 was a pretty good year, with progress on all fronts. What is the 1949 outlook?

The outlook is good, though a realistic look ahead reveals a few cloudy spots.

Labor troubles again may dog the industry in 1949, as they have done in past years. Union officials are known to be thinking in terms of a 30-hour week without loss of pay, as well as other increased benefits, and Mr. Lewis is on record with a threat to dictate his own stabilization measures if the industry approaches a "bust." The result of these demands could be an extended stoppage called by Mr. Lewis to blackjack the industry into submission, with the growing danger of government seizure and eventual nationalization of the industry. However, if the voices of some thoughtful men are heeded, the operators can improve their chances of getting a fair shake at the bargaining table by approaching negotiations in a conciliatory frame of mind, ready to offer constructive proposals and resolved to reach an agreement that is fair to all and not injurious to the industry.

Increased taxes to finance the President's "Fair Deal" also may be a major problem for coal in 1949. Though an out-and-out excess profits tax seems less likely since Mr. Truman's message to Congress on Jan. 5, increased corporation taxes are expected to provide a big chunk of the $4,000,000,000 tax boost he asked for, cutting deep into funds needed by the industry to improve its capital equipment and buy new properties. Coal's best bet to protect itself and the public from the consequences of more burdensome taxes is more economic research, able presentation of the findings to the public and before Congressional committees and close contact by individual operators with their representatives in Washington.

Labor-Law Changes Ahead

The President's pledge to junk the Taft-Hartley Law is still another threat to coal in 1949. That law enabled coal men, for the first time since the Wagner Act was passed, to meet Mr. Lewis and his union on fairly even terms. Its outright repeal would put coal back to where it was under the Roosevelt administration—not a very happy outlook, to put it mildly. However, as the new Congress got under way after the first of the year, labor-committee leaders in both houses seemed inclined to go slow and it appeared likely that the Wagner Act would be somewhat modified before being reinstated. Again, as in the matter of taxes, coal's best bet for fair treatment lay in making its voice heard where it counted most—before the public and in contact with law-makers.

As 1948 drew to a close, still another problem, overcapacity and overproduction, began to take shape, with the possibility of becoming more acute in 1949. Bituminous stocks totaling, on Dec. 1, 1948, some 66,500,000 tons, the highest since Oct. 1, 1943, caused alarm in some quarters. Although a look at the facts should quiet fears of an all-out "bust" ahead, nevertheless, to guard against this danger, a good deal of thought was being given to possible stabilization measures (p. 74, this issue).

In spite of the dark spots, the fact remained that the brighter side of the picture for 1949 is stronger than the cloudy side.

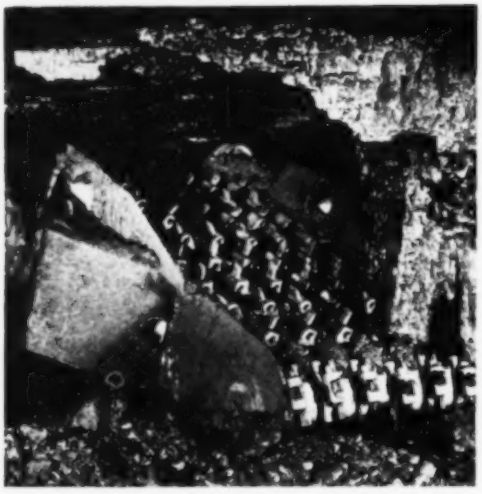
To begin with, take only one factor—plans for capital expenditures in 1949 laid down by manufacturing, mining, transportation and utilities industries. A brand-new survey of business' plans for new plants and equipment, conducted by the McGraw-Hill economics staff, reveals that American industry will invest $14,100,000,000 in new facilities in 1949, only 5 percent less than the record-breaking total actually spent in 1948, and has plans for spending $40,000,000,000 in the four-year period 1950-53. Coal, closely geared to all industry as the major source of energy, necessarily must go along in this expansion.

Coal's Position Strong

For this growth, coal already is pretty well equipped, thanks to heavy investments in plants, mines and facilities over the past 15 years, with capital outlay in 1948 estimated at over $200,000,000 and supply-and-equipment expenditures at $370,000,000. More and more, the coal mines are providing a quality product for customers, thus offering stronger competition in the fuels market. Further strengthened by a nation-wide merchandising program in Coal Heating Service, coal is in good position to meet and beat its competition.

The country's growing population, now numbering more than 148,000,000, together with an ever-rising standard of living based on high national income, adds up to a healthy nation with more demand for the homes, goods and services provided, directly or indirectly, by coal.

Barring a shooting war, a major decline in industrial and business activity and a long drawn-out labor stoppage, all these factors together make it reasonable to predict for 1949 a bituminous production close to the 1948 total and an anthracite output of even more than '48. By any standard, even that of 1947, which was unusual in many ways, 1949 will be another pretty good year.



NEW MINING-AND-LOADING MACHINES—an outstanding 1948 development—promise a major advance in cost reduction and safety.

Machine Mining Accelerates

New, Larger and More-Efficient Equipment for Underground Mining, Stripping and Preparation Increase Coal's Ability to Compete at a Profit, Operate More Safely and Render Better Service to the Public

TWO NEW mining-and-loading machines, a 45-cu.yd. shovel dipper and growing stress on mechanical preparation marked developments on the coal-mining front in 1948. Once again, the percentage of coal produced by mechanical methods underground and cleaned by mechanical methods on the surface showed an increase. Big walking draglines continued their gains in stripping, particularly in the bituminous industry, while the number of deep anthracite jobs involving trucking of spoil showed a major increase.

With commercial production of one mining-and-loading machine under way and increased stress being laid on the design and construction of others, indications were that the end of 1949 would see a substantial number in operation in a variety of mines with a variety of conditions. The characteristics of the equipment, incidentally, are such that it should extend materially the application of mechanical equipment to pitching veins.

Operating with crews of 4 to 6 men, compared to 8 to 20 for the conventional units, the new machines promise a major increase in tons per man, a corresponding cut in production cost and a real step forward in safety as a result of a reduction in injuries and fatalities from roof falls.

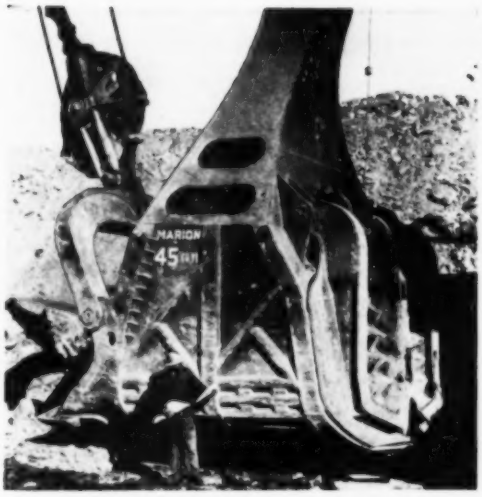
New Methods Forecast

Announcement of the new mining-and-loading machines brought in its train consideration of the possibility of departing from the room-and-pillar system on which the United States coal industry was built. Indications were strong that some type of wall work would follow increased installation of the new equipment to permit operation with a minimum of the interruptions now necessary for shifting to new places in pillar work. Improved roof support to permit open-ended wall work and conveyor transportation already is under consideration.

Meantime, active installation of conventional loading and conveying equipment continued at a high level in 1948 and on into 1949. Loading-machine purchases by bituminous operators totalled 723 last year (see p. 94 of this issue), against 485 in 1947. Conveyor purchases in 1948 totalled 1,025, compared to 846 in 1947. As in recent years, the major activity in the installation of such equipment—and the necessary auxiliaries, such as cutting, drilling and timbering machines, shuttle cars, and so on—was in the eastern and southern states.

Along with installation of equipment, emphasis on increasing unit output continued, with the result that another new record was set in 1948. A 19-man crew at Mine No. 63 of the Consolidation Coal (W. Va.), Monongah, W. Va., loaded 1,536 tons in one shift using a crawler loader, universal cutter and three shuttle cars. Previous records were: Mine No. 207, Consolidation Coal Co. (Ky.), Dunham, Ky., Sept. 25, 1947, 14-man crew, 1,466 tons; Mine No. 38, Consol of W. Va., Sept. 16, 1948, 20-man crew, 1,402 tons.

Increased use of low-type crawler, track- and rubber-tired loaders and self-loading conveyors with both power- and non-power swing in thin coal was a feature of developments in 1948. Another was the wider use of loader and shuttle car



STRIPPING AND PREPARATION in 1948 featured by new highs in dipper capacity and mechanical cleaning.

units in the pitching seams of the west, including one installation designed to increase productivity under very bad top. In this installation, rubber-mounted cutters double in brass as timbering machines and the units are designed to work in as few as two places. One result was an increase of 50 to 100 percent in tons per man on the section.

A substantial rise in the use of rubber-mounted cutters and drills marked developments in auxiliary equipment in 1948. Increasing use of large units for heavy-duty operation, however, was paralleled by installation of small rubber-mounted bottom-drilling augers with plow handles, as well as auger-type under cutters, also with plow handles and selling at less than $3,000, for truck-mine service (p. 99 of this issue). Numerous old shortwalls were equipped with bugdusters and a number of companies embarked on programs of replacing old machines with new units so equipped.

The use of special-alloy and tungsten-carbide-insert bits staged another advance in 1948, which again was marked by a strengthening of the trend toward longer cutter bars. At the end of the year, a coal-company-developed flexible-shaft drill was made available for general use. It is a hand-held unit receiving power from a take-off unit on a mining machine. In addition, it was announced that the flexible-shaft principle also could be employed to operate such equipment as rock dusters, face conveyors, face pumps, hoists, timber saws, spray systems and other such units.

Air coal-breaking moved into new fields and new mines in 1948. At the same time, multiple shooting with permissibles was becomingly increasingly accepted, particularly in low coal, from both the efficiency and safety standpoints. In connection with such shooting, both anthracite and bituminous operations extended their use of the fog gun at working faces. And to assist loading units and also for miscellaneous work elsewhere, small electric bulldozers were finding ready acceptance at the end of the year.

Timbering-Machine Practice

Timbering machines moved farther toward a position of standard loading-unit equipment in 1949. One company using them adopted the practice of bundling up a shift's supply of bars and posts, taking them into the mine on regular timber trucks, picking them up with chain hoists, pulling the trucks out and then lowering the bundles onto two-wheeled semi-trailers, which remain connected to the timbering machines throughout the shift.

Suspension-type roof supports spread fast in 1948. This method of bolting crossbars to the roof was being used or experimented with in at least five states. Where bolting was not being employed, the trend was heavily toward pin, pin-and-jack and pin-and-stringer support for crossbars in working places for greater safety and easier moving of equipment.

Island or hilltop operations figured prominently in new deep-mine developments in 1948. Where new operations had to go down for the coal, the belt slope was the overwhelming favorite, with skip shafts next. Lifts with belts in the bituminous industry increased to at least 862 ft. Sinking slopes with loading machines and conveyors was supplemented, according to reports, by the use of a boring-type entry driver at one mine. This latter slope also featured a new scheme of compartmentation, with belt and man-and-material openings one above the other rather than side by side. Corrugated steel plates were increasingly used for lining slopes and auxiliary shafts.

In the anthracite region, haulage at one property was shortened materially with a substantial reduction in cost by installation of a cotton-nylon belt 2,640 ft. long center-to-center. Inclination of the belt is 15 deg., width is 36 in., the drive is 400 hp. and the capacity is 300 t.p.h.

For main-line haulage, plans were laid in 1948 for at least one belt conveyor two miles long, while a 1,200-hp. drive was being built for another installation.

In preparation for development, both deep and strip mines were resorting in increasing numbers to aerial mapping of the terrain as an aid to the proper location of surface plants and proper opening of the coal bodies. Quonset-type portal buildings were increasingly employed, along with smaller steel

portable or semi-portable buildings for outlying substations, magazines and the like. One operation engaged in island mining extended the principle by putting its service buildings on wheels to make it easier to move them from opening to opening.

Housing was not neglected in the development of new properties. As a result, new mines were being equipped with the latest in housing facilities including all the modern conveniences. In addition, existing housing at a number of older plants was being modernized or replaced completely where life of the properties justified it.

In addition to slope and mainline belts, continued emphasis was placed on other aspects of transportation as a means of raising mine efficiency. In line with activity in recent years, the trend was toward big mine cars, section or mother belts and prefabricated track for working sections. A new high in capacity of cars for outside haulage was set in 1948 with the placing of an order for 30-ton drop-bottom equipment for a southern West Virginia operation. Automatic-coupler installation increased substantially. Use of the so-called overlapping mine car for continuous loading from belts increased in 1948. Some were especially built while on others slanting end boards were added by the operators.

The first use of the track-shoe type of brake on main-line locomotives was another 1948 development. Frequency-modulation communication systems staged a major growth as an aid in haulage and in general mine operation. And as a sidelight, some operations adopted the practice of purchasing predried locomotive sand in closed hopper-bottom cars. One such mine dumps the sand into a track hopper from which it flows into a 50-ton tank installed in an old shaft and thence to the locomotives on the mine bottom. All sand-drying labor at the mine is eliminated and all of the handling is by gravity.

In the working sections, as noted, mother belts were increasingly used in 1948, along with shuttle cars, either with or without such belts. Special feeders between shuttle cars and belts were increasingly employed and the practice of automatically controlling belt speed to accommodate shuttle-car discharges was worked out to a practical point. Haulage at small truck mines was featured by growing use of rubber-tired end-dump mine cars pulled by battery tractors; also battery-powered end-dump trucks were used.

New Bituminous Preparation Facilities in 1948*

Coal Company	Plant Location	Capacity, Net Tons of Feed per Hour	Preparation Equipment
Amherst Coal Co.	Fanco, W. Va.	300	Link-Belt
Bell & Zoller Coal & Mining Co.	Mortons Gap, Ky.	200	Link-Belt
Black Eagle Smokeless Coal Co.	Mullens, W. Va.	250	Jeffrey
Black Star Coal Corp.	Alva, Ky.	300	McNally-Pittsburg[1]
Blue Bird Coal Co.	Harrisburg, Ill.	75	Jeffrey[2]
	Harrisburg, Ill.	185	Jeffrey[3]
Blue Diamond Coal Co.	Leatherwood, Ky.	700	Roberts & Schaefer[4] Jeffrey[4]
Blythe Bros. Co.	Anawalt, W. Va.	300	McNally-Pittsburg
Cambria-Clearfield Mining Co.	St. Benedict, Pa. (2)	250	Prins[5]
Cameo Coal Co.	Cameo, W. Va.	300	McNally-Pittsburg[6]
Charles E. Campbell	Bridgeville, Pa.	50	Western Machinery[7]
Carpentertown Coal & Coke Co.	Mt. Pleasant, Pa.	100	Roberts & Schaefer[8]
Cedar Grove Mining Co.	Danville, W. Va.	100	Iowa Mfg. Co.[9]
Centertown Coal Co.	Centertown, Ky.	200	McNally-Pittsburg[6]
Central Appalachian Coal Co.	Montgomery, W. Va.	100	Kanawha
Central Coal Co.	New Haven, W. Va.	400	McNally-Pittsburg[6]
Central Coal Co.	Monterey, Tenn.	100	Iowa Mfg. Co.[9]
Central Sand & Gravel Co.	Frostburg, Md.	50	Western Machinery[7]
Clean Eagle Coal Co.	Logan, W. Va.	35	Western Machinery[7]
Clinchfield Coal Corp.	Dante, Va.	200	Fairmont[10]
Clinchmore Coal Mining Co.	Clinchmore, Tenn.	300	McNally-Pittsburg
Clintwood Coal Co.	Mouthcard, Ky.	150	Kanawha
Colly Elkhorn Coal Co.	Whitesburg, Ky.	100	Iowa Mfg. Co.[9]
Colonial Coal Mining Co.	Madisonville, Ky.	400	McNally-Pittsburg[6]
Consolidated Coal Co.	Mt. Olive, Ill.	60	McNally-Pittsburg[6]
	Johnston City, Ill.	400	McNally-Pittsburg[11]
Consolidation Coal Co. (Ky.)	Deane, Ky.	200	Roberts & Schaefer[24] Link-Belt[24]
Crowe Coal Co.	Clinton, Mo. (3)	600	McNally-Pittsburg[13]
D.J.C. Collieries, Inc.	Grundy, Va.	125	Roberts & Schaefer[12]
Dawson Collieries, Inc.	Dawson Springs, Ky.	100	McNally-Pittsburg[6]
Dawson Daylight Coal Co.	Dawson Springs, Ky.	200	McNally-Pittsburg[6]
DeBardeleben Coal Corp.	Sipsey, Ala. (4)	50	Deister Concentrator[14]
W. G. Duncan Coal Co.	Greenville, Ky.	200	McNally-Pittsburg[6]
Eastern Coal Corp.	Stone, Ky.	125	Roberts & Schaefer[12]
	Hardy, Ky.	100	Iowa Mfg. Co.[9]
Eastern Gas & Fuel Associates	Barrett, W. Va.	250	McNally-Pittsburg[21]
	Kopperston, W. Va.	275	McNally-Pittsburg[21]
Elk Horn Coal Corp.	Wayland, Ky.	100	Jeffrey
Elliott Coal Mining Co.	Osceola, Pa.	300	McNally-Pittsburg
Ethel Chilton Mines, Inc.	Ethel, W. Va.	100	Prins
Fayette-Jellico Coal Co.	Warren, Ky.	100	Prins[5]
Feds Creek Coal Co.	Biggs, Ky.	500	Roberts & Schaefer[12]
Freebrook Corp.	Timblin, Pa.	150	Roberts & Schaefer[8]
	Widnoon, Pa.	150	Roberts & Schaefer[15]
Glen-Mary Coal Co.	Robbins, Tenn.	100	Iowa Mfg. Co.[9]
Guyan-Eagle Coal Co.	Stowe, W. Va.	200	Link-Belt
Hatfield-Campbell Creek Coal Co.	Point Lick, W. Va.	350	Jeffrey
Hocking Valley Mining Co.	Kimberly, Ohio	100	Roberts & Schaefer[12]
Imperial Coal Corp.	Coalport, Pa.	100	Kanawha[16]
Independent Coal & Coke Co.	Kenilworth, Utah	350	McNally-Pittsburg
Indian Head Mining Co.	Hazard, Ky.	100	Iowa Mfg. Co.[9]
E. L. Jarroll	Morrisvale, W. Va.	100	Iowa Mfg. Co.[9]
Jewell Ridge Coal Corp.	Hazard, Ky.	300	McNally-Pittsburg
	Jewell Valley, Va.	60	Kanawha[16]
Johnstown Coal & Coke Co.	Panther Gulch, W. Va.	60	Kanawha[16]
Jones & Laughlin Steel Corp.	La Belle, Pa.	2,000	Link-Belt[26]
Kanawha Coal Corp.	Eskdale, W. Va.	75	Jeffrey[17]
Key Coal Co.	Astoria, Ill. (2)	350	McNally-Pittsburg[13]
Logan County Coal Corp.	Lundale, W. Va.	150	Jeffrey[1]
Maumee Collieries Co.	Keller, Ind.	500	Link-Belt[27]
Middle Fork Coal Co.	Paintsville, Ky.	100	Iowa Mfg. Co.[9]
Midland Electric Coal Corp.	Atkinson, Ill. (2)	700	McNally-Pittsburg[11]
Midwest Radiant Corp.	Millstadt, Ill. (4)	40	Deister Concentrator[14]
Miners Coal Co.	Mannington, Ky.	400	Jeffrey[18]
Minton Lumber Co.	Barboursville, Ky.	100	Iowa Mfg. Co.[9]
Moffat Coal Co.	Sparta, Ill.	175	Jeffrey
Moss & McCormack Coal Co.	Nauvoo, Ala. (2)	25	Deister Concentrator[14]
[illegible]	Summerlee, W. Va.	160	Kanawha[17] Jeffrey[17]
New River Co.	Cranberry, W. Va.	175	Jeffrey[22]
	Skelton, W. Va.	175	Jeffrey[22]

Handling of men featured a substantial increase in new portals with special elevator or other equipment for getting the men to and from the bottom. Special man-trip cars were increasingly employed and in at least some instances there was a trend toward special designs in one-section capacities, making it possible to run individual cars clear into the sections instead of requiring all men to unload at a central point and then walk in. A material saving in travel time is reported where this is the practice. In low

New Bituminous Preparation Facilities in 1948*

Coal Company	Plant Location	Capacity, Net Tons of Feed per Hour	Preparation Equipment
Norfolk & Western Ry.	Williamson, W. Va.	250	Jeffrey
North-East Coal Co.	Thealka, Ky.	150	Prins
	Thealka, Ky.	200	Prins
Northland Coal Co.	East Lynn, Va.	80	McNally-Pittsburg
Nugent Mining Co.	Dubois, Pa.	60	Western Machinery[7]
Panther Coal Co.	Marybill, W. Va.	200	Jeffrey[2]
Peabody Coal Co.	Ameagle, W. Va.	250	Roberts & Schaefer[19] Link-Belt[18]
Penn. Coal & Coke Corp.	Gallitzin, Pa.	300	Fairmont[10]
	Winburne, Pa.	125	Western Machinery[20]
Pittsburgh Coal Co.	Champion, Pa.	290	Link-Belt[28]
	Amonate, W. Va.	160	Link-Belt[28]
Pocahontas Fuel Co.	Itmann, W. Va.	700	Link-Belt[28] Roberts & Schaefer[28]
Pond Creek Pocahontas Co.	Carver, Ky.	250	Link-Belt[30]
Powellton Coal Co.	Mallory, W. Va.	250	Link-Belt[30]
Princess Elkhorn Coal Co.	Permele, Ky.	85	Roberts & Schaefer[19]
Puritan Coal Corp.	Puritan Mines, W. Va.	400	McNally-Pittsburg[21]
Red Jacket Coal Corp.	Keen Mountain, Va.	80	Kanawha[26]
Republic Steel Corp.	Russellville, Pa. (16)	160	Deister Concentrator[14]
Riddlesburg Mining Co.	Riddlesburg, Pa.	50	Western Machinery[7]
Rochester & Pittsburgh Coal Co.	Lucerne, Pa. (18)	180	Deister Concentrator[14]
Roden Coal Co.	Marvel, Ala. (2)	25	Deister Concentrator[14]
Sand Lick Coal Co.	Belcraft, Ky.	100	Iowa Mfg. Co.[6]
Semet-Solvay Division	Tralee, W. Va.	450	Fairmont[10]
Seminole Coal Corp.	Lenzburg, Ill. (2)	400	McNally-Pittsburg[21]
Shaw-Tutwiler, Inc.	Piper City, Ala. (2)	25	Deister Concentrator[14]
Sherwood-Templeton Coal Co.	Midland, Ind.	135	Link-Belt[31]
Simpson Creek Collieries Co.	Galloway, W. Va. (2)	250	Western Machinery[7]
Slab Fork Coal Co.	Slab Fork, W. Va.	150	Jeffrey[2]
	Slab Fork, W. Va.	150	Jeffrey
Snap Creek Coal Co.	Wilber, W. Va.	200	Fairmont[10]
Springfield Coal Corp.	St. Benedict, Pa.	250	Prins[5]
Stephens-Elkhorn Fuel Co.	Manton, Ky.	300	McNally-Pittsburg
Sunday Creek Coal Co.	Corning, Ohio	300	Prins[5]
Tenn. Coal, Iron & R.R. Co.	Concord, Ala.	275	Fairmont[10]
Turkey Gap Coal & Coke Co.	Dott, W. Va. (2)	330	McNally-Pittsburg[21]
Webb Mining Co.	Ferndale, W. Va.	250	Kanawha[26]
Westmoreland Coal Co.	Hampton, W. Va.	400	Fairmont[10]
West Kentucky Coal Co.	Earlington, Ky.	500	Roberts & Schaefer[19]
West Virginia Coal & Transportation Co.	W. Columbia, W. Va.	300	Roberts & Schaefer[19]
Williams Coal Co.	Mannington, Ky.	100	Prins
Wyodak Coal Co.	Wyodak, Wyo.	200	Link-Belt
Youngstown Mines Corp.	Dehue, W. Va.	350	Nelson L. Davis[29]

*Includes additions and installations of new preparation equipment in existing structures. Where more than one unit was installed in a plant, the number, when available, appears in parentheses after the plant address.

(1) McNally-Norton automatic washing equipment with Carpenter and Bird centrifugal dryers and filters. (2) Unit washer. (3) Washing plant. (4) Including Jeffrey Baum jig (575 t.p.h.), Bird filter and Raymond flash dryer. (5) Including Prins washing equipment and Robins dewaterizers.

(6) McNally-Norton automatic washing equipment. (7) WKE (HMS) Mobil-Mill equipment. (8) R&S Hydrotator equipment. (9) Portable tipple. (10) Including Chance sand-flotation equipment.

(11) McNally-Norton automatic washing equipment with McNally-Vissac thermal dryers. (12) R&S Hydro-Separator equipment. (13) Including McNally-Norton automatic washing equipment with middlings retreatment. (14) SuperDuty Diagonal-Deck coal-washing tables with Concenco revolving feed distributors as follows: Republic Steel, 3; Rochester & Pittsburg, 3; Roden, 1. (15) R&S Super-Airflow equipment.

(16) Kanawha-Belknap chloride washer. (17) Diaphragm-jig equipment. (18) Jeffrey Baum-jig equipment. (19) R&S Super-Airflow cleaning plant with predrying in Link-Belt Multi-Louvre equipment. (20) Heavy-media plant.

(21) McNally-Norton automatic washing equipment with Carpenter centrifugal dryers. (22) Mine-run handling and storage plant, including screening. (23) R&S Hydro-Separator units (coarse sizes) and Hydrotator equipment (fines). (24) Including Link-Belt air-pulsated jig, Multi-Louvre dryers and Bird filters. (25) McNally-Menzies cone-separator equipment.

(26) Link-Belt float-sink concentrators (heavy-media) for 1947 contract by Nelson L. Davis Co. (27) Including Link-Belt combination trough washer and air-pulsated jig, Multi-Louvre and centrifugal dryers. (28) Including Link-Belt float-sink concentrator (heavy-media) equipment. (29) Including Link-Belt float-sink concentrators (heavy-media), Multi-Louvre dryers, R&S Super-Airflow dry cleaners. (30) Link-Belt air-pulsated jig.

(31) Link-Belt trough separator. (32) Baum-jig equipment for 1947 contract by Kanawha Mfg. Co.

coal, several types of small battery-powered one- and two-man trikes or jeeps were used in increasing numbers, along with larger battery-powered semi-trailers holding up to a full crew. New track jeeps included one with a battery in addition to the trolley pole to permit operation when the power is off. Also, it is handier to switch and back and there is not as much temptation to backpole.

Electrically, the trend toward rectifiers and non-inflammable transformers continued, and the use of aluminum feeder and borehole cable showed a major increase, along with sectionalization of cables serving face equipment and circuit-breaker grounding to supplement sectionalization and general protection with such equipment. In addition to breakers for protecting men and face equipment, experiments were being conducted on the possibilities of short-circuiting contactors for trailing cables. Further work also was being done on devising new methods of creating derived neutrals for grounding with low-voltage delta-connected a.c. mine circuits. In one a.c. mine, also, graphic ammeters were installed in each working-section substation, and the responsibility of changing the charts each day was placed on the mine foreman. Therefore, the foreman must visit each substation every day and the men on the section know that the chart will reveal a slow-down.

As an additional safety measure, a number of operations practicing sectionalization of distribution systems were installing additional equipment to cut off all power when the ventilating pressure drops. Ventilation was being improved at some properties by drilled shafts sufficiently large for the installation of emergency equipment for handling men when necessary. Bleeder headings and special escapeways increased in number, along with the practice of splitting.

Fan installation in 1948 was featured by a major increase in the use of corrugated steel ducts as adits, especially at island or contour mines. Growing numbers of standby fan drives or standby fans also distinguished 1948 developments, the drives including a number of fully-automatic gas-engine units. At one new shaft property, in addition, a diesel-electric standby unit was designed with sufficient capacity to also operate lights and the man-and-material hoist. At this same property, also, the main hoist motor is supplied with power from an m.g. set without a flywheel.

Increasing use of tile, cinder or concrete blocks and corrugated steel for temporary stoppings was another 1948 development. In some instances, the operators contended that they were cheaper than wood, even if left in place, in addition to being fireproof. Special recoverable blocks for temporary stoppings also were used in increasing numbers, and experiments also were being conducted into the possibilities of sealing stoppings with a plastic coating. New brattice cloths included glass-fiber and plastic types.

New Anthracite Preparation Facilities in 1948*

Coal Company	Plant Location	Capacity, Net Tons of Feed per Hour	Preparation Equipment
Allerman & Schoener	Schuylkill Haven, Pa.	7	Deister Concentrator[1]
Ashland Hydrotator Co.	Ashland, Pa.	18	Wilmot[2]
B. & N. Coal Co.	Cressona, Pa. (2)	30	Wilmot[2]
Bernice White Ash Coal Co.	Mildred, Pa.	15	Wilmot[2]
Blackwood Construction Co.	Frackville, Pa.	25	Wilmot[2]
Broad Mountain Fuel Co.	Schuylkill Haven, Pa. (2)	27	Deister Concentrator[1]
Buck Run Coal Co.	Buck Run, Pa.	40	Wilmot[2]
Buck Run Collieries Co.	Buck Run, Pa.	50	Western Machinery[4]
Cabin Creek Coal Co.	Scotch Valley, Pa. (5)	111	Wilmot[2]
Capone Coal Co.	Luzerne, Pa. (4)	178	Wilmot[2]
D. & Z. Coal Co.	Shamokin, Pa.	10	Menzies[5]
Jacob Dailey	Bloomsburg, Pa.	12	Deister Concentrator[1]
Dark Corners Coal Co.	Paxinos, Pa.	15	Wilmot[2]
F. & L. Coal Co.	Shamokin, Pa.	12	Menzies[5]
Franklin Hydrotated Coal Co.	Ravine, Pa.	18	Wilmot[2]
G. & M. Coal Co.	Rocky Glen, Pa. (3) Moosic, Pa. (2)	21 14	Menzies[5] Deister Concentrator[1]
Gilberton Coal Co.	Gilberton, Pa.	125	Western Machinery[4]
Glacier Coal Co.	Cumbola, Pa.	50	Wilmot[2]
Glen Alden Coal Co.	Edwardsville, Pa. (3) Wanamie, Pa.	210 100	Menzies[5] Wilmot[2]
Gravity Coal Co.	Avoca, Pa.	7	Deister Concentrator[1]
Haven Coal & Supply Co.	Schuylkill Haven, Pa.	7	Deister Concentrator[1]
Heidelberg Coal Co.	Avoca, Pa.	5	Deister Concentrator[1]
Hudson Coal Co.	Olyphant, Pa. (2)	195	Wilmot[2]
Kehoe-Berge Coal Co.	Pittston, Pa. (2)	100	Wilmot[2]
Leon Kocher Coal Co.	Valley View, Pa.	70	Menzies[5]
Lehigh Navigation Coal Co.	Coaldale, Pa. (2)	80	Wilmot[2]
Locust Coal Co.	Shenandoah, Pa. (2)	135	Wilmot[2]
Locust Valley Coal Co.	Mahanoy City, Pa.	50	Wilmot[2]
Lohb Coal Co.	Schuylkill Haven, Pa. (3)	90	Wilmot[2]
Markson Coal Co.	Goodspring, Pa. (2)	37	Menzies[5]
Franklin I. Miller	Ravine, Pa. (2)	40	Wilmot[2]
Moosic Coal Co.	Jessup, Pa. (2)	10	Deister Concentrator[1]
Mountain Top Fuel Co.	Maryd, Pa. (2)	55	Wilmot[2]
Motley Coal Co.	Mayfield, Pa. (2)	20	Menzies[5]
Northwest Coal Co.	Scranton, Pa.	22	Menzies[5]
Philadelphia & Reading Coal & Iron Co.	Brookside, Pa.	65	Wilmot[2]
Phoenix Coal Co.	Phoenix Park, Pa. (6)	420	Wilmot[2]
Racket Brook Coal Co.	Carbondale, Pa.	15	Wilmot[2]
Renninger Coal Co.	Zerbe, Pa.	15	Wilmot[2]
Rhoads Contracting Co.	Ashland, Pa.	50	Wilmot[2]
Rosini Bros.	Shamokin, Pa. (2)	38	Wilmot[2]
Savitsky Bros.	Atlas, Pa.	15	Wilmot[2]
Stevens Coal Co.	Shamokin, Pa.	50	Wilmot[2]
Swatara Coal Co.	Minersville, Pa.	7	Deister Concentrator[1]

*Includes contracts for installation of new preparation equipment in existing structures. Where more than one equipment unit was installed, the number, when available, is given in parentheses after the plant address.

[1]SuperDuty No. 7 Diagonal-Deck coal-washing tables plus one Concenco revolving feed distributor each for the Gravity and Moosic coal companies.

[2]Wilmot Hydrotator equipment.

[3]Simplex jig equipment.

[4]WKE (HMS) Mobil-Mill equipment.

[5]Menzies cone-separator equipment.

The translucency of the latter was considered a major advantage in preventing collisions between men and equipment at curtains.

Sprinkling and spraying at the face showed a major increase in 1948, with increased attention to the dust-killing possibilities of high-pressure fogs (up to 400 lb. per sq. in.). An increasing number of operators were finding quick-coupling pipe a major help, cutting the cost of installing and moving sprinkling facilities.

Quick-coupling pipe also staged a major advance in the field of mine drainage, with a number of large companies standardizing on it for both underground and surface uses. Black plastic pipe, flexible and without plies or braids, was an added starter in the drainage field. One operation faced with a water emergency laid 3,000 ft. of 2-in. to two gathering pumps in one day. The 2-in. size comes in 200-ft. coils 6 ft. in diameter and two men can carry a coil easily.

Pumping developments included a substantial increase in the use of deepwell vertical turbine units in the anthracite region, while a southern West Virginia operation was adding a fourth 5,000-g.p.m. 450-hp. unit to a 10x12 shaft station, making it, it is claimed, the largest vertical pumping station in the world.

Hydraulic operation of mining equipment staged another major advance in 1948, along with increased stress on better maintenance, better shop facilities, increased use of special greasing trucks and growing employment of special electrical insulations. As an example of the latter, the ripping head on one new mining-and-loading machine is powered by motors with complete silicone insulation supplemented by water cooling. On another, all operations are powered by hydraulic motors.

STRIPPING

WIDER USE of large walking draglines, an increase in stripping depth in both the anthracite and bituminous fields and a further rise in dipper and bucket capacities marked 1948 stripping developments, along with the adoption of new special units, such as the big auger for increasing coal recovery, greater attention to shooting vibration, frequency-modulation radio communication, disposal of overburden by shooting and a sharp increase in spoil utilization by farming.

Featuring modified armor plate and new welding techniques, a 45-cu.yd. dipper went into service on an eastern Ohio shovel Dec. 1. Fully loaded weigh, of the new unit, it is announced, is no greater than that of the 35-yd. dipper of three years ago. For faster filling, the lip has been designed with a pronounced curve. If successful, this 45-yd. unit should mark a new step forward in the capacity of shovels powered with the conventional 4,000-volt equipment, whereas it had been contended that any increase over 40 yd. probably would require going to 6,000 volts at a considerable increase in shovel cost.

Installations of large walking draglines included at least one new unit especially designed for two-position operation, thereby providing, with variations in reach and bucket size, maximum efficiency in both normal and thick overburden.

Increasing depth of overburden and the pressure for lower costs were naturally the major factors in the increase in equipment size, as well as in the further use of such special auxiliary units as the wheel excavator and the tower machine for knocking the top off the deeper cover. At at least one bituminous operation of the hillside or contour type, stripping depth had been extended to 175 ft. with even greater planned using draglines.

Spoil haulage in the bituminous fields also showed a major increase in 1948, particularly at the contour operations of the East and South. Developments in this field included the use of special rubber-tired trac-

tor-operated wagons designed for side-dumping without stopping. One factor in the growth of spoil haulage was the fact that the material normally could be laid down to conform to state regulations without further leveling.

Shooting of a part of the spoil over the hill also was a growing practice in contour stripping, with the operators giving as the reason the fact that it is cheaper to use explosive energy rather than electric or engine power. As much as 30 percent of a cut can be disposed of by this method, some operators report.

Overburden preparation also was featured by growing use of two-level horizontal drills, special tractor-mounted air units for drilling local hard spots or intervals between seams and growing installation of self-contained diesel-electric augers. On the shooting side, there was an increase in split-second firing of shots and in checking with seismographs to make sure that vibrations were not sufficient to affect neighboring buildings.

Deep-basin stripping increased in the anthracite region in 1948, with most of the operations relying on benching and hauling of spoil. Benching also increased in contour and hillside stripping in the bituminous industry, with increased attention being given to adjusting depth of bench cuts to equalize the output from successive shovel cuts following the initial dragline cuts. Benching with scrapers was, as in the past, the practice at a number of operations, with others calling on scrapers for the complete stripping job.

Haulage developments in 1948 were again featured by a strengthening of the trend toward larger units with higher operating speeds. Along this line, a new 45-ton high-speed unit with airplane-type engine rated at approximately 700 hp. (butane fuel) was being given field trials at the end of the year. Features include dynamic braking for down-grade operation under load.

At operations using the smaller trucks, there was an increase in the number of units without hoists, dumping being accomplished either by running the trucks up inclines or by raising the bodies with electric hoists.

In the field of electric service to stripping units, there was a major increase in the use of unit substations and in the protection of personnel and equipment through sectionalization of distribution circuits and ground-resistor equipment. The year also witnessed the introduction of a new device for detecting shorts and grounds in cables (see p. 107 of this issue).

Special new equipment and methods included the use of large augers to recover coal beyond the stripping limit by boring it out (*Coal Age*, December, 1948). Coal loading was characterized by a rise in the number of tractor-mounted and other special loading units.

Farming of strip spoils showed a major increase in 1948, along with tree planting and other methods of reclamation. As a result, it is now difficult in certain areas to buy either fresh or planted banks. Farming and other reclamation measures were, naturally, the big answer to attempts to penalize or regulate stripping, which increased in 1948.

PREPARATION

ANOTHER EXPANSION in mechanical cleaning, featured by a rise in contracts for heavy-media plants, increased emphasis on screening and a substantial advance in the treatment of fines were among the coal-preparation highlights of 1948. Contracts for straight screening and picking installation increased slightly but still were a minor fraction of the year's total. As in past years, many mechanical units went into existing plants to handle specific sizes, particularly in the anthracite region. Practically all the anthracite installations, in fact, were made for beneficiating the buckwheat sizes, with one heavy-media plant for barley and up, plus several small self-contained units employing the heavy-media principle for various sizes.

Bituminous operators contracted for both wet and dry equipment in 1948 but apparently not for any combination plants. Included in the list was a number of heavy-media plants, both of the full-scale and self-contained types. Top sizes in mechanical cleaning again reached 8 in. or more. In the majority of installations, however, the top was 4 in. and again the practice of washing coarse coal and bypassing or air-cleaning the fines was evident in a number of plants. Another sharp acceleration in the trend toward mechanical cleaning of fines was evident in 1948, however, with coal-washing tables a popular unit.

Another increase in the number of storage and blending bins ahead of preparation plants was a feature of the year's developments, which also included increased stress on drying with vibrating screens, centrifugal dryers, centrifugal filters and thermal equipment. The latter included a new type of heat dryer developed at an Indiana coal-mining operation. There also was an increase in the number of rotary breakers for preliminary sizing and rough cleaning of coal before mechanical preparation.

A rise in the number of plants designed for loading only stoker and screenings was one evidence of the fact that crushing again increased. Separate picking, crushing and loading of lower-grade coal and bone was the practice at a growing number of plants, with some going farther and installing mechanical equipment for cleaning this specific fraction to further heighten its quality.

Numerous reports indicate that a major expansion is taking place in screening capacity. One operation, for example, doubled its capacity in 1948, while all five vibrators in another plant were replaced with units providing a much-larger screening area. Reasons include an increase in mechanical loading and consequently in the output of finer coal, consumer pressure for better preparation, more sprinkling underground and increasing use of mining-and-loading machines.

The portable tipple on rubber tires staged a major advance in 1948. Designed especially for truck and strip mines, some of the recent units have included mounted crushers for preparing stoker coal. It is expected that future designs will include small washers.

New auxiliary features in 1948 included spring-mounted oscillating conveyors for distributing washed sizes, greater use of rubber instead of steel pipe for handling water containing coal, slurry and refuse, a rise in the installation of heat-treated or alloy plates for conveyor bottoms, the first installation of automatic sprinkler protection against fire, greater use of sodium yard lighting, and bolting of plant structures rather than riveting or welding.

In the field of refuse disposal, at least one operation was crushing a part for making concrete blocks, while an anthracite company was using it as the basis for a lightweight aggregate for the building trades. Pumping of refuse staged an increase, along with belt and larry disposal, while the number of operations using trucks or larries with bulldozers on the bank increased substantially.

Loader and Cleaner Sales Rise

Paced by a 49-Percent Increase in Mobile-Loader Sales, Mechanical-Mining Capacity Rose 55 Percent in 1948—Mother-Conveyor and Shuttle-Car Use Increased, With Bituminous Mechanical-Cleaning Capacity up 2 Percent

By W. H. YOUNG, Chief, Bituminous Coal Section, and R. L. ANDERSON, Engineer-Economist, U. S. Bureau of Mines, Washington, D. C.

UNDERGROUND mechanical-loading equipment shipped to coal mines in the United States was 55 percent greater in 1948 than in 1947 in terms of capacity, while the capacity of mechanical-cleaning equipment sold for use at bituminous mines was 2 percent greater. Shipments of "mother" conveyors and shuttle cars increased 15 and 62 percent, respectively.

This survey was made possible by the courteous cooperation of all known manufacturers of mechanical-cleaning equipment for bituminous coal and manufacturers of mechanical-loading and supplementary haulage equipment for use in all coal mines in the United States. Data from various trade journals also were utilized.

Mechanical-loading and supplementary haulage-equipment "sales in 1948" represent shipments made during that year. A small percentage of the mechanical-cleaning equipment sold in 1948 was put into operation during the year. The remainder will be installed in 1949 and 1950.

Mechanical Loading

Bituminous coal and lignite mechanically loaded in underground mines increased from 245,340,768 tons in 1946 to 298,157,281 tons in 1947, or 21.5 percent. Mechanical loading in Pennsylvania-anthracite mines rose from 15,619,162 tons in 1946 to 16,054,011 tons in 1947, or 2.8 percent.

Table I gives data on bituminous and lignite production by methods of mining and mechanical cleaning for the years 1946 to 1948, inclusive. Although the total production in 1948 dropped as compared to 1947, the percentage stripped, mechanically loaded and mechanically cleaned each increased.

Types of Units Sold—Table II lists the number of units of mechanical-loading equipment shipped to bituminous, anthracite and lig-

Table I—Bituminous Coal and Lignite Production, by Methods of Mining and Mechanical Cleaning, in the United States, 1946-48, Inclusive

	1946		1947		1948*	
	Thousands of Net Tons	Percent of Total	Thousands of Net Tons	Percent of Total	Thousands of Net Tons	Percent of Total
Surface stripping	112,964	21.2	139,395	22.1	138,000	23.2
Hand-loaded underground	175,617	32.9	193,072	30.6	170,000	28.6
Mechanically loaded underground	245,341	45.9	298,157	47.3	286,000	48.2
Total production	533,922	100.0	630,624	100.0	594,000	100.0
Mechanically cleaned	138,670	26.0	174,436	27.7	175,000	29.5

*Preliminary.

Table II—Units of Mechanical-Loading Equipment Sold to Bituminous, Anthracite and Lignite Mines for Underground Use in the United States, as Reported by Manufacturers, 1941-48, Inclusive

	1941	1942	1943	1944	1945	1946	1947	1948	Percent Change, 1948 from 1947
Type of equipment:									
Mobile loaders	368	352	234	286	359	495	486	725	+49.2
Scrapers[1]	11	29	15	39	26	35	35	49	+40.0
Conveyors[2]	2,130	1,491	1,100	708	861	1,157	987	1,209	+22.5
Pit-car loaders	10	2	†	—[3]	—[3]	—[3]	—[3]	—[3]	——
Total, all types	2,519	1,874	1,350	1,033	1,246	1,687	1,508	1,983	+31.5
Number of manufacturers reporting	32	28	24	22	25	24	23	22	——

1. Reported as scrapers or scraper loaders and hoists.
2. Includes hand-loaded conveyors and those equipped with duckbills or other self-loading heads. Sales of both loading heads and conveyors were counted for 1941, but the figures for 1942-48, inclusive, do not include loading heads separately.
3. Canvass of sales of pit-car loaders discontinued in 1945.

Table III—Total Number of Units of Mechanized Loading Equipment Shipped for Use in Each State in 1948

(L, mobile loading machines; S, scrapers; C, conveyors)

State	Number of Units of All Types Shipped in 1948	Types of Equipment in Approximate Order of Capacity
Bituminous and lignite mines:		
Alabama	74	C.L.
Arkansas	19	C.L.
Colorado	12	L.C.
Idaho	4	C.
Illinois	50	L.C.
Indiana	16	L.C.
Kentucky	270	L.C.S.
Maryland	1	C.
Montana	1	C.
New Mexico	3	L.
North Carolina	3	C.S.
Ohio	80	L.C.
Oklahoma	18	C.
Pennsylvania	386	L.C.S.
Tennessee	39	L.C.
Utah	21	L.C.
Virginia	55	L.C.
Washington	2	S.
West Virginia	698	L.C.S.
Wyoming	13	C.S.L.
Total bituminous and lignite	1,765	L.C.S.
Pennsylvania-anthracite mines	218	C.S.L.
Grand total	1,983	L.C.S.

Table IV—Sales of Mechanical-Loading Equipment in 1948 Compared With Total Number of Machines in Active Use in Preceding Years

	—Number of Machines in Active Use, as Reported by Mine Operators—							Number of Machines Sold, as Reported by Manufacturers
	1941	1942	1943	1944	1945	1946	1947	in 1948
Bituminous and lignite mines:								
Mobile loading machines	1,985	2,301	2,525	2,737	2,950	3,200	3,569	723
Scrapers	109	93	83	87	87	75	67	17
Pit-car loaders	607	481	321	241	142	93	71	....[1]
Conveyors equipped with duckbills or other self-loading heads	788	1,062	1,226	1,331	1,383	1,521	1,531	....[2]
Hand-loaded conveyors, number of units	2,807	3,041	3,191	3,236	3,385	3,470	3,979	1,025
Anthracite mines (Pennsylvania):								
Mobile loading machines	....[3]	....[3]	5	12	20	27	25	2
Scrapers	505[3]	524[3]	510	491	548	564	594	32
Pit-car loaders	....[4]	....[4]	....[4]	....[4]	....[4]	....[4]	....[4]	....[2]
Conveyors equipped with duckbills or other self-loading heads	....[4]	....[4]	....[4]	....[4]	....[4]	....[4]	....[4]	....[2]
Hand-loaded conveyors, number of units	2,432[4]	2,491[4]	2,701[4]	2,807[4]	3,006[4]	3,233[4]	3,457[4]	184

1. Canvass of sales of pit-car loaders discontinued in 1945.
2. Sales of conveyors equipped with duckbills or other self-loading heads are included with hand-loaded conveyors.
3. Mobile loading machines are included with scrapers.
4. Pit-car loaders and conveyors equipped with duckbills or other self-loading heads are included with hand-loaded conveyors.

nite mines for underground use in the United States for the period 1941-48 inclusive. Each type of equipment showed a large increase in 1948 over the previous year. Sales of mobile loaders rose from 486 in 1947 to 725 in 1948, or 49.2 percent.

Total Sales by States—Total mechanical-loading units shipped to the various states in 1948 is shown in Table III. Types of equipment shipped are indicated by letter symbol in the approximate order of capacity. For example, 270 mechanical-loading units were shipped to Kentucky. Of this total, mobile-loading machines (indicated by "L") furnished the largest addition to capacity, followed by conveyors ("C") and scrapers ("S"). Capacities are based on 1947 records of performance as reported by mine operators.

In 1948, 1,765 mechanical-loading units of all types were shipped to bituminous and lignite mines, an increase of 422 units, or 31.4 percent, over the 1947 total of 1,343. Total units shipped to Pennsylvania-anthracite mines increased from 165 in 1947 to 218 in 1948, or 32.1 percent.

Mechanical-loading equipment exported in 1948, in terms of capacity, was equivalent to 9 percent of the shipments made to United States mines. The proportion in 1947 was 19 percent.

Types of Loading Equipment Sold Compared with Units in Use—The trend in demand for various types of mechanical-loading equipment is shown in Table IV. At bituminous and lignite mines, three types of loading devices (mobile loaders, self-loading conveyors and hand-loaded conveyors) have increased substantially in number from 1941 to 1947. The other two (scrapers and pit-car loaders) have declined.

Table V—Comparison of Mechanical-Loading Equipment and "Mother" Conveyors in Actual Use in 1947 With Sales Reported in 1948, by States

State	Mechanical-Loading Equipment						"Mother" Conveyors[3]
	Mobile Loaders		—Scrapers—		—Conveyors[1]—		
	In Use in 1947	Sales in 1948	In Use in 1947	Sales in 1948	In Use in 1947	Sales in 1948	Sales in 1948
Bituminous and lignite mines:							
Alabama	135	8	31	....	358	66	6
Arizona	....	....	....	....	....	....	1
Arkansas	....	1	....	....	73	18	....
Colorado	28	4	1	....	307	8	....
Idaho	....	....	....	....	....	4	....
Illinois	554	44	....	....	27	6	14
Indiana	142	14	....	....	....	2	....
Iowa	5	....	....	....	12	....	....
Kentucky	351	124	1	1	709	145	41
Maryland	3	....	....	....	35	1	....
Michigan	....	....	....	....	1	....	....
Montana	41	....	....	....	8	1	....
New Mexico	18	3	6	....	1	....	....
North Carolina	....	....	....	1	....	2	....
North Dakota	7	....	....	....	....	....	....
Ohio	179	36	....	....	178	44	5
Oklahoma	4	....	....	....	83	18	5
Pennsylvania	800	169	14	2	1,024	215	25
Tennessee	15	19	....	....	171	20	3
Utah	87	15	....	....	132	6	....
Virginia	98	20	....	....	188	35	4
Washington	1	....	6	2	97	....	....
West Virginia	1,071	265	....	8	1,797	425	124
Wyoming	30	1	8	3	309	9	2
Total bituminous and lignite	3,569	723	67	17	5,510	1,025	230
Pennsylvania-anthracite mines	25	2	594	32	3,457[2]	184	5
Grand total	3,594	725	661	49	....	1,209	235

1. Includes hand-loaded conveyors and conveyors equipped with duckbills or other self-loading heads.
2. Includes all haulage conveyors with capacity over 500 ft. except main slope conveyors. Data on number in use in 1947 are not available.
3. Includes pit-car loaders and duckbills or other self-loading conveyors.

Total mechanical-loading units of all types in use in Pennsylvania-anthracite mines increased from 2,937 in 1941 to 4,076 in 1948, or 39 percent, compared to a 46-percent increase at bituminous and lignite mines in the same period.

Table VI—Number of Mobile Loaders in Use in Bituminous and Lignite Mines, by Types of Loading in Each State, 1946 and 1947

State	Number of Mobile Loaders: Loading Direct Into Mine Cars 1946	1947	Loading Onto Conveyors 1946	1947	Loading Into Rubber-Tired Trucks 1946	1947	Total Number in Use 1946	1947
Alabama	24	28	58	65	30	42	112	135
Colorado	10	12	1	2	19	14	30	28
Illinois	453	416	28	27	101	111	582	554
Indiana	108	103	....	....	40	39	148	142
Iowa	....	2	4	3	....	....	4	5
Kentucky	156	179	10	14	123	164	289	351
Maryland	....	....	1	....	....	3	1	3
Montana (bit. and lig.)	43	36	....	....	4	5	47	41
New Mexico	12	13	....	....	4	5	16	18
North Dakota (lig.)	6	7	....	....	....	....	6	7
Ohio	117	119	17	20	28	40	162	179
Oklahoma	....	....	4	4	....	....	4	4
Pennsylvania (bit.)	494	556	43	67	156	177	693	800
Tennessee	4	3	....	....	7	12	11	15
Utah	55	58	11	9	14	20	80	87
Virginia	73	76	3	3	7	19	83	98
Washington	1	1	....	....	....	....	1	1
West Virginia	689	772	27	47	187	252	903	1,071
Wyoming	24	22	....	4	6	4	30	30
Total	2,267	2,307	207	265	726	907	3,200	3,569

Table VII—Bituminous Coal Cleaned in 1947 and Capacity of Equipment Sold in 1948, in the United States, by Types of Equipment[1]

Type of Equipment	1947: Number of Plants in Operation[2]	Net Tons of Cleaned Coal[3]	Percent Cleaned by Each Type	Annual Capacity of Equipment Sold in 1948[1], Net Tons
Wet Methods:				
1. Jigs	234	85,931,353	49.3	....[4]
2. Concentrating tables	9	2,080,368	1.7	....[4]
3. Classifiers	67	14,647,771	8.4	....[4]
4. Launders	19	17,602,394	10.3	....[4]
5. Dense-media	70	17,702,322	10.1	....[4]
6. Jigs and concentrating tables	14	4,302,422	2.5	....[4]
7. Other combinations of Methods 1, 2, 3, 4, and 5	27	12,616,822	7.2	....[4]
Total wet methods	440	156,083,452	89.5	29,100,000
Pneumatic methods	84	18,352,485	10.5	1,900,000
Grand total	524	174,435,937	100.0	31,000,000

1. A small percentage of the equipment sold in 1948 was placed in operation during the year and the remainder will be placed in operation during 1949 and 1950.
2. Includes plants operated by consumers at central washeries in Colorado and Pennsylvania.
3. Based on 234 days (average days mines were active in 1947) and 7.5 hours per day.
4. Included under "Total wet methods."
5. Includes a duplication of 63 plants using both wet and pneumatic methods; deducting this duplication gives a net total of 461 plants that cleaned coal in 1947.

Types of Equipment Purchased by States—Table V shows the number of mobile loaders, scrapers and conveyor units shipped into the various states in 1948 and the number in use in 1947. West Virginia received the greatest number of mobile loaders, followed by Pennsylvania, Kentucky and Illinois in the order named. West Virginia also received the most conveyors, followed by Pennsylvania, Kentucky and Alabama.

Pennsylvania-anthracite mines received 32 scrapers in 1948, compared to 23 in 1947. Conveyor units shipped to anthracite increased from 141 in 1947 to 184 in 1948.

Haulage Equipment

"Mother" Conveyors—For the purpose of this study, a "mother" conveyor is defined as a sectional, extensible power-driven conveying unit that can handle over 500 ft. of conveyor. Main-slope conveyors are excluded.

The last column in Table V shows the sales of mother conveyors by states in 1948. West Virginia received the largest number (124) followed by Kentucky (41), Pennsylvania (25) and Illinois (14). The total number of mother conveyors shipped in 1948 was 235, against 204 in 1947. No capacity estimates have been made for this equipment and it is not included in the summaries of mechanical-loading equipment.

Trackless Gathering Equipment—Shipments of shuttle cars were made to 13 states in 1948. West Virginia received the greatest number—39 percent. Kentucky, Pennsylvania, Illinois and Alabama followed in the order named. During 1947, 28 percent of the total bituminous coal and lignite loaded by mobile loaders was handled by shuttle cars, compared to 25 percent in 1946. The remainder of the mobile-loader tonnage was loaded onto conveyors (4 percent) or directly into mine cars (68 percent).

Table VI shows the number of mobile loaders used at bituminous and lignite mines, by states and types of loading, in 1946 and 1947. Total mobile loaders in use increased from 3,200 in 1946 to 3,569 in 1947, or 11.5 percent, while the number loading into rubber-tired trucks or shuttle cars rose from 726 to 907, or 24.9 percent. Approximately 2,000 shuttle cars were used in bituminous and lignite mines in 1947.

Mechanical Cleaning

Reports from 15 manufacturers of bituminous-coal cleaning equipment show that sales were made in nine states in 1948. Total capacity of the 1948 sales was 17,700 net tons of cleaned coal per hour, compared to 17,300-tons capacity sold in 1947.

Table VII gives data on bituminous coal cleaned in 1947 by type of equipment in use and also the annual capacity of equipment sold in 1948. For comparative purposes, annual capacity of 1948 sales is based on the average number of days (234) bituminous mines were active in 1947. However, only a small percentage of the cleaning equipment sold in 1948 was placed in operation during the year. The remainder will be installed in 1949 and 1950.

The capacity of all types of equipment sold in 1948 for cleaning coal by wet methods was equivalent to 18.6 percent of the bituminous coal so cleaned in 1947, while the capacity of pneumatic equipment sold in 1948 was 10.4 percent of the tonnage pneumatically cleaned in 1947.

The ratio of 1948 sales of new cleaning plants to additions or replacements of present plants, in terms of capacity, was 40 percent new plants and 60 percent additions or replacements.

Review and Outlook

Coal Sets New Safety Record

Both Anthracite and Bituminous Mines Establish New Lows in Fatality Rates—Gains Made on All Fronts With the Exceptions of Roof and Face Falls, Explosives, Machinery and "Other Causes," Including Stripping

By FORREST T. MOYER

Chief, Accident Analysis Branch, U. S. Bureau of Mines

THE BEST annual safety record in coal-mining history was achieved in 1948. The sharp improvement in fatal-injury rates over both 1947 and 1946—the best previous year—may be attributed to intensified safety work, to which the workers, mine officials and state and federal safety-inspection services each made important contributions. The acute awareness of the importance of working safely and maintaining safe working places on the part of all connected with the industry materially aided in accident-prevention work.

As a result of changes in the annual tonnages of coal mined, year-to-year comparisons of safety progress are made most reasonably on rates of occurrence of injuries. The changes in annual coal production result in corresponding changes in the exposure of men to hazards.

Based upon nearly complete reports, an estimated total of 1,015 men were killed at work in bituminous, anthracite and lignite mines in 1948. This is 150 less than the total of 1,165 in 1947 and also less than in any other year back to 1910, except for 1946, when 974 men lost their lives.

The 1948 fatalities occurred at a rate of 1.56 per million tons in the production of approximately 651,000,000 tons of coal. This was the lowest annual rate in the statistical history of the industry. It was 5 percent below the former low of 1.64 per million tons in 1946, when production was slightly more than 592,000,000 tons. The 1948 rate also was an appreciable improvement over 1947, when production was nearly 688,000,000 tons and the fatality rate was 1.69.

Estimates show that 870 men were killed at work at bituminous and lignite mines in 1948, the fourth lowest number since complete fatality statistics were first compiled in 1910. The rate was 1.46 fatalities per million tons in the mining of 594,000,000 tons, and was the lowest annual rate in the statistical history of bituminous mining. It was appreciably lower than the rate of 1.57 in 1947, when 990 men were killed in mining 630,600,000 tons. Although there were 70 more fatalities in bituminous mines than the record low of 800 in 1946, the 1948 rate was better than the rate of 1.50 per million tons in 1946 as a result of a 12-percent gain in mine output.

Of the total 1948 bituminous fatalities, 768 occurred in underground workings, 55 at surface works associated with deep mines and 47 at strippings.

At Pennsylvania anthracite mines it is estimated that 145 workers were killed in 1948. This was 30 fewer than in 1947 and was the second-lowest annual total in a history extending back to 1870. The fatality rate was 2.54 per million tons in the production of 57,052,000 tons of clean anthracite. The lowest in statistical history, the 1948 rate represented a sharp improvement over the 1947 rate of 3.06. Although two more men were killed than the record low of 143 in 1945, the 1948 rate was better than the 1945 rate of 2.62 as a result of greater production. At anthracite operations, the 1948 fatalities occurred as follows: underground workings, 126; surface works associated with deep mines, 8; strippings, 11.

Major Disasters

The 1948 record of major disasters—those in which five or more men were killed in a single accident—was one of the best in coal-mining history and a considerable improvement over 1947. There were six major disasters during the year with a total loss of 49 lives. The 1947 record also was six disasters but the loss of life was 179.

All the 1948 disasters were in bituminous mines. Three were mine explosions and the other three were unusual in cause. The record was: (1) mine explosion, Sun Excelsior mine, Excelsior, Ark., Feb. 8, eight men; (2) bump, No. 2 mine, Dante, Va., May 20, six men; (3) mine explosion, Kings Station mine, Princeton, Ind., July 27, 13 men; (4) mine explosion, Edgewater mine, Birmingham, Ala., July 30, 11 men;

Coal-Mine Fatalities in the United States During 1948*

Cause and location	Bituminous Number of fatalities	Bituminous Rate per million short tons	Penn. Anthracite Number of fatalities	Penn. Anthracite Rate per million short tons	Total Number of fatalities	Total Rate per million short tons
Underground:						
Falls of roof and face	479	0.807	89	1.560	568	0.872
Haulage	154	0.259	12	0.210	166	0.255
Explosions: Local	9	0.015	2	0.035	11	0.017
Major	32	0.054			32	0.049
Explosives	23	0.039	10	0.175	33	0.051
Electricity	19	0.032	1	0.018	20	0.031
Machinery	27	0.045	1	0.018	28	0.043
Shaft	9	0.015			9	0.014
Miscellaneous	16	0.027	11	0.193	27	0.041
Total underground	768	1.293	126	2.209	894	1.373
Stripping or open-cut	47	0.079	11	0.193	58	0.089
Surface	55	0.093	8	0.140	63	0.097
Grand total, 1948	870	1.465	145	2.542	1,015	1.559
Grand total, 1947	990	1.570	175	3.060	1,165	1.694
Production, 1948 (est.)	594,000,000		57,052,000		651,052,000	
Production, 1947 (est.)	630,624,000		57,190,000		687,814,000	

*Estimated from nearly complete returns.

(5) fall on man-trip, No. 11 Berwind mine, Capels, W. Va., Aug. 6, six men; (6) suffocation underground from gases and smoke pulled into mine from burning surface building, Nethken mine, Kitzmiller, Md., five men.

There were no major disasters in Pennsylvania anthracite mines in 1948, while in 1947 three explosions killed 33 men.

Falls of Roof and Face

Each year, falls of roof and face result in by far the greatest number of fatal injuries in mines. Control of this hazard in 1948 was not as effective as in 1947 and a total of 568 men were killed. Roof falls accounted for 56 percent of all mine fatalities in 1948, against 47 percent in 1947. Moreover, the rate for roof-fall fatalities in 1948 was 0.87 per million tons, compared to 0.79 in 1947.

The roof-fall record indicates the need for detailed studies of roof support. Hanging the roof and preventing any flexure of the individual overlying layers, advocated by the Bureau and new to mining, appears to be a promising method of support, especially in heavy ground and other places difficult to hold.

In bituminous mines, 479 men, it is estimated, lost their lives through falls of roof and face in 1948, or 17 more than in 1947, when coal production was appreciably greater. The death rate was 0.81 per million tons, against the 1947 rate of 0.73.

At anthracite operations, the estimated 89 fatal injuries from falls of roof and face was higher than the total of 83 in 1947. Likewise, the rate of 1.56 fatalities per million tons was an increase over the 1947 rate of 1.45.

Although the 1948 record of roof-fall fatalities compares unfavorably with that of 1947, there unquestionably has been a long-term improvement in the control of this hazard. This improvement may be gaged by comparing the 1948 rate with the 1939 rate of 1.39.

Haulage

Haulage normally ranks second among the principal causes of fatal accidents underground. In 1948, underground haulage caused the deaths of 166 men—a total well below that of 213 in 1947. The 1948 deaths occurred at a rate of 0.26 per million tons, comparing favorably with the 1947 rate of 0.31. The 1948 improvement was a marked step forward in the long-term improvement shown by comparison with the 1939 rate of 0.41 per million tons.

In bituminous mines, it is estimated that 154 men were killed in underground haulage in 1948, against 195 in 1947. Concurrently, the rate dropped from 0.31 per million tons in 1947 to 0.26 in 1948. At anthracite operations, haulage fatalities dropped from 18 in 1947 to 12 in 1948 and the rate per million tons from 0.31 to 0.21.

Gas and Dust Explosions

Better control of the explosion hazard through ventilation, rock dusting and improved dust-control methods is indicated by the 1948 fatality record. Ten gas and dust explosions caused loss of life in 1948. Three were major disasters and seven were local explosions. In all, 45 men were killed by explosions, against 188 in 1947. The fatality rate of 0.07 per million tons in 1948 was well under the rate of 0.27 in 1947.

The three major explosions and six of the locals were in bituminous mines. The majors killed 32 men in 1948 and the locals 11. In 1947, major explosions resulted in 146 fatalities at bituminous mines; locals, seven. There were no major explosions in anthracite mines and the one local resulted in two fatalities.

Explosives

Although the coal industry is the largest consumer of industrial explosives in the United States, only 33 of the 1,015 fatalities in all coal mines resulted directly from explosives. Fatalities from gas and dust explosions in which explosives may have been a contributing factor are not included in this cause classification.

Explosives were not handled and used as safely in 1948. Consequently, both the number and rate of fatalities increased in 1948 in both bituminous and anthracite mining. In bituminous mines, 23 men were killed by explosives; in anthracite mines, 10.

Electricity

Fatality experience with electricity in 1948 indicated an improvement in safeguards against electrical accidents. This hazard caused 20 deaths in 1948, at a rate of 0.03 per million tons, against 27 fatalities and a rate of 0.04 in 1947.

Electrical fatalities at bituminous mines totaled 19 in 1948, at a rate of 0.03, compared to 24 deaths and a rate of 0.04 in 1947. Only one man was killed by electricity in underground workings in the anthracite industry, compared to three at a rate of 0.05 in 1947.

Machinery

The trend toward increased mechanical mining is making coal men acutely aware of the hazards of machinery. However, the progress in the safe operation of machinery in 1946 and 1947 was set back somewhat in 1948. The machinery hazard was responsible for 28 fatalities in underground workings, at a rate of 0.04 per million tons. Fatalities increased in 1948 to 27 at bituminous mines, against 24 in 1947. One man was killed by machinery in anthracite mines in 1948, against none in 1947.

Other Causes

Approximately 85 percent of the fatalities at coal mines resulted from the foregoing principal causes. The remaining 157 fatalities in 1948 resulted from a variety of relatively minor causes in underground work, in stripping and in surface works associated with deep mines.

Safety at both bituminous and anthracite strippings receded in 1948. A total of 47 men were killed at bituminous strippings in 1948 and 11 at anthracite operations, or 17 more than in 1947 for both. At surface works associated with deep mines, fatality experience improved at anthracite operations and receded at bituminous. The 55 fatalities in bituminous surface works was eight more than in 1947. At anthracite operations, eight men lost their lives in surface work, against 14 in 1947.

Non-Fatal Injuries

It is estimated that approximately 54,100 non-fatal lost-time injuries occurred at all coal mines in 1948, or at a rate of 83.10 per million tons mined. In bituminous mines, the estimate of 41,500 non-fatal injuries represented a frequency of 69.87 per million tons. The tentative total of 12,600 non-fatal injuries of anthracite operations represented a rate of 220.85 in 1948. These estimates are based upon the experience of reporting companies during the first nine months of 1948. These data are published by the Bureau in a new monthly series of reports known as the "C. M. I." series, and include number of injuries, frequency rates on both the tonnage and man-hour bases, and employment and working time.

MACHINE OPERATOR and W. & L. Coal Co. partner, James E. Landsperger, sits on the handles of the machine while it cuts. C. W. Wilken (left), the other partner, is showing a visitor, S. K. Bartges (center), the operation of the unit.

CUTTER LOADED on a tilting truck ready for moving to the next working place. The truck is moved by hand or pulled by a pony. Five augers rotate clockwise and six counterclockwise for cutting, the bits missing each other in egg-beater style.

Auger Undercutting

New Lightweight Low-Cost Undercutter Used at the W. & L. Truck Mine Is Operated by a 3-Hp. A.C. Motor and Uses Eleven Augers to Make a 3½-In. Kerf 26 In. Wide and 54 In. Deep in as Little as Two Minutes

THE AUGER-TYPE undercutting machine is a new unit now being offered specifically for the small truck mine. One such machine, shown in the accompanying illustrations, has been working since Aug. 15, 1948, in the W. & L. Coal Co. mine near Maidsville, W. Va. Several others are in use in Pennsylvania and West Virginia. With a 3-hp. a.c. motor the cutter can operate satisfactorily on a rural electrification line and the price, at the time the material was gathered for this report, was less than $2,500, including truck.

Undercutting is done in breast-machine fashion. In other words, the machine is sumped straight in, then pulled back and moved over for the next cycle. In one sumping cut, making a 3½-in. kerf and requiring as little as two minutes, the auger machine makes a cut 26 in. wide and 54 in. deep. It is moved into the coal by rubber-tired wheels driven through a three-speed gear box. Normally, the lowest speed is used for cutting and the highest for tramming and loading onto the tilting-type track truck.

Cutting Heads Double-Pronged

The eleven augers, 1½ in. in diameter, have double-pronged cutting heads 3½ in. in diameter, clearing each other ¾ in. by reversed rotation, egg-beater style. Every other auger rotates clockwise and those between rotate counterclockwise. Cutting heads are detachable and each prong is fitted with a Kennametal insert.

Two handles enable the cutter to be manipulated like a garden tractor. Turning is done by operating a clutch in the drive of one wheel. In the W. & L. mine, where the Sewickley seam ranges from 40 to 60 in. in thickness, the machine operator finds it convenient to sit on the handles during cutting to add weight and increase the traction of the wheels. Minimum seam thickness in which the machine will cut is 19 in. The motor on the machine illustrated is a 3-hp. 110 220-volt single-phase Master Electric unit operating on 220 volts.

A. C. Jones, Rockwood, Pa., a truck-mine operator, developed the machine for his own use and is now the sales agent. The Miller Machine Co., Springs, Pa., is the manufacturer.

Undercutting and consequent shooting relief, which results in a coarser coal that can be cleaned by hand, puts a truck mine so equipped in a preferred position. A greater safety factor through eliminating solid shooting is another important advantage.

James E. Landsperger, Maidsville, and C. W. Wilken, Morgantown, own and operate the W. & L. Coal Co. mine. They normally employ 4 to 6 coal loaders but have employed as many as 11 men during periods in the past.

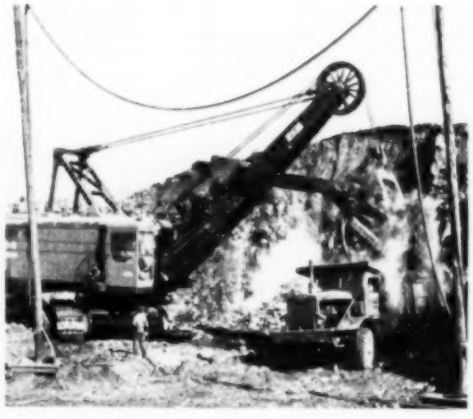
THE SHEN-PENN ANTHRACITE STRIPPING, skirting the eastern edge of Shenandoah, Pa., where about 1,000,000 cu.yd. of overburden is moved each month and 5,000 net tons of raw coal is recovered each day.

Shen-Penn Stripping

Stripping in Settled Area Laced by Railroads and Highways Handled With Small Shovels and Bench Mining—Underground Fire Complicates Shooting Problem—Auxiliaries Include Seismograph and Cable Tester

THE MINING of 25-ft. benches with 5- and 6-yd. shovels is progressing at the Shenandoah stripping of the Shen-Penn Production Co., near the Borough of Shenandoah, Pa. The Shen-Penn operation —a subsidiary of The Philadelphia

THREE DIPPER LOADS OF ROCK from this 6-yd. electric shovel, located on the 1,275-ft. level over the Top Split of the Mammoth vein, start the truck on its way to the spoil dump. Sixty-five 14.8-cu.yd. trucks serve eight shovels at Shen-Penn.



THIS 6-YD. ELECTRIC SHOVEL, the newest of four 6-yd. units on the job, loaded from another bench the previous day. Note the cable crossing. Not even a passenger automobile is permitted to drive across a trailing cable at Shen-Penn.

HERE IN THE SHEN CITY PIT, a 5-yd. electric shovel is loading anthracite from the 30-ft.-thick Bottom Split Mammoth vein after the removal of about 45 ft. of overburden.

& Reading Coal & Iron Co.—involves stripping 291 acres in the Shenandoah Basin to a depth of 390 ft. in places, and was started Aug. 26, 1946. Approximately 66,277,000 cu.yd. of overburden is to be removed to recover 11,108,000 gross tons of rough cleaned coal from the Holmes, Four Foot and Top and Bottom splits of the Mammoth veins, all previously deep-mined.

The re-routing of a township road, the detouring of State Highway 45 and subsequent return to its original location, and the relocation of a double-tracked railroad are a few of the extra problems connected with this 10-year project. In addition, part of the area has been afire since 1932 which, of course, makes blasthole work more difficult.

About 30 percent of the coal from the four veins being stripped was removed in earlier underground operations. The area included in the stripping is 8,100 ft. long and 3,000 ft. wide, and is part of the general syncline forming the Shenandoah Basin. A fault with a displacement of 500 ft. along a 45-deg. plane runs lengthwise of the basin near the south edge. State Highway 45 bisects the stripping on a north-and-south line. West of Route 45, the stripping will progress from north to south across the basin; east of Route 45, the work will go from south to north.

The Shen-Penn project has been complicated by unusual problems from the very beginning. First, 3,700 ft. of the double-tracked line of the Lehigh Valley R.R. had to be relocated. Still another 7,850-ft. section on a 2-percent grade will be shifted toward the center of the area later. A new 4,200-ft.-long black-top township road (Fig. 1) has been built near the south edge of the stripping to replace the old road near the center of the basin. An 8-in. water main, which ran the entire length of the stripping, also had to be removed and water service provided from another source.

Underpass Speeds Truck Haulage

An underpass under Route 45 has been completed to permit the coal trucks from the eastern half of the stripping to use the same haulage road to the St. Nicholas breaker as those from the western half. A 3,500-ft.-long detour will be maintained for Route 45 while the old road site is being stripped. Eventually the road will be returned to its original location.

During the early stages of the planning of the Shen-Penn project, 25-cu.yd. draglines were considered. As a result of further study, however, smaller shovels, mostly 5- and 6-yd. units (Table I), were purchased and a bench-mining plan was adopted. In the deepest part of the basin, the number of 25-ft. benches will total up to 16, starting at the 1,350-ft. level and going down, Fig. 2.

The shovels are P & H and Bucyrus-Erie units and, except for one $1\frac{1}{2}$-cu.yd. diesel-driven outfit, are operated from a 4,160-volt a.c. distribution system. The doors and windows in most of the cabs are kept closed and the m.g. sets are ventilated with filtered air. The size of the shovels at Shen-Penn makes them easy to move. Consequently, the drilling and loading areas can be widely separated to suit the conditions of the job.

Some 65 Type TD end-dump Euclid trucks with 14.8-cu.yd., or 22-ton bodies serve the eight shovels. All are used to transport overburden on the second and third shifts. On the first shift, about 20 trucks are used to haul the coal loaded by the two 5-yd. and one $1\frac{1}{2}$-yd. shovels. The daily production, at the time that this article was being prepared, was about 4,500 net tons of run-of-pit coal. However, production was scheduled to be boosted to about 6,000 net tons by January, 1949. Coal is trucked about two miles to the St. Nicholas breaker (*Coal Age*, August, 1948) for preparation. On the return trip, refuse from the Maple Hill cleaner plant is trucked out and dumped in the stripped area.

All the trucks are equipped with

Varied Conditions Influence Shen-Penn Operation Methods

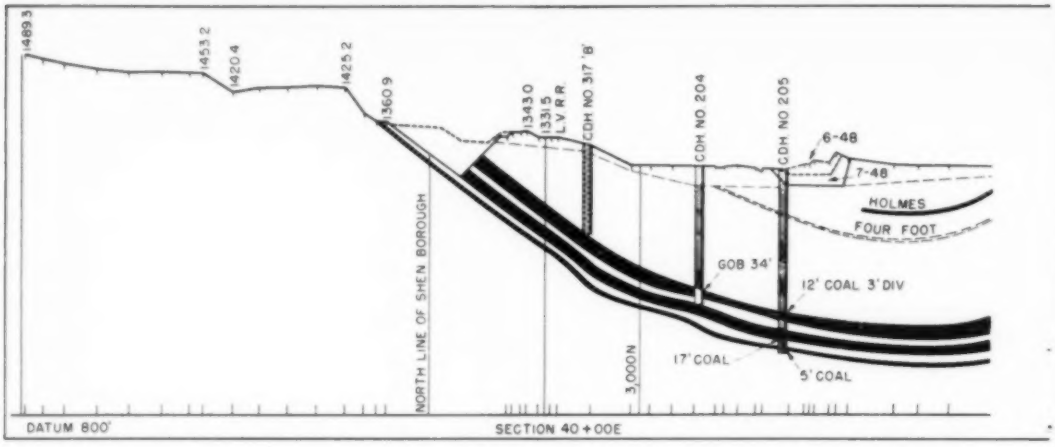


FIG. 1—TYPICAL CROSS-SECTION of the Shenandoah Basin (looking east)

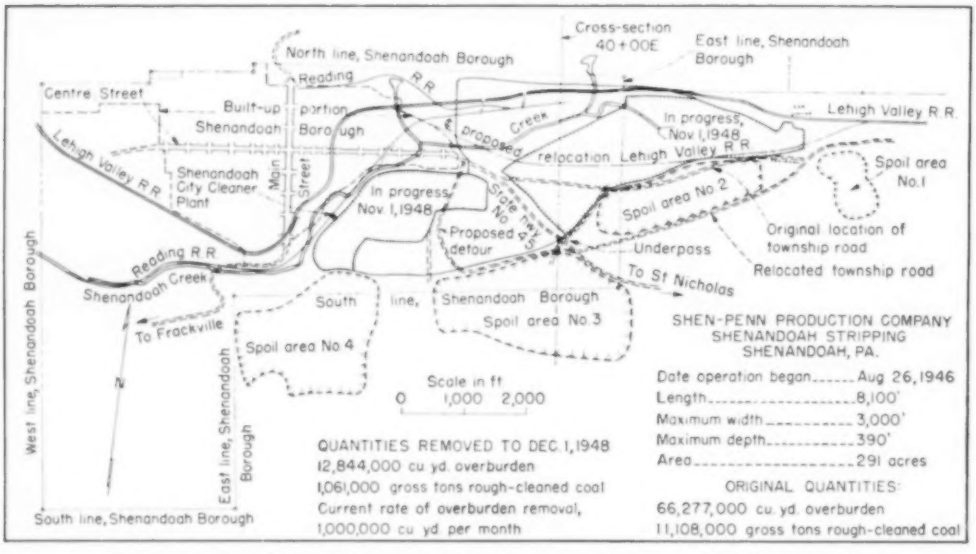


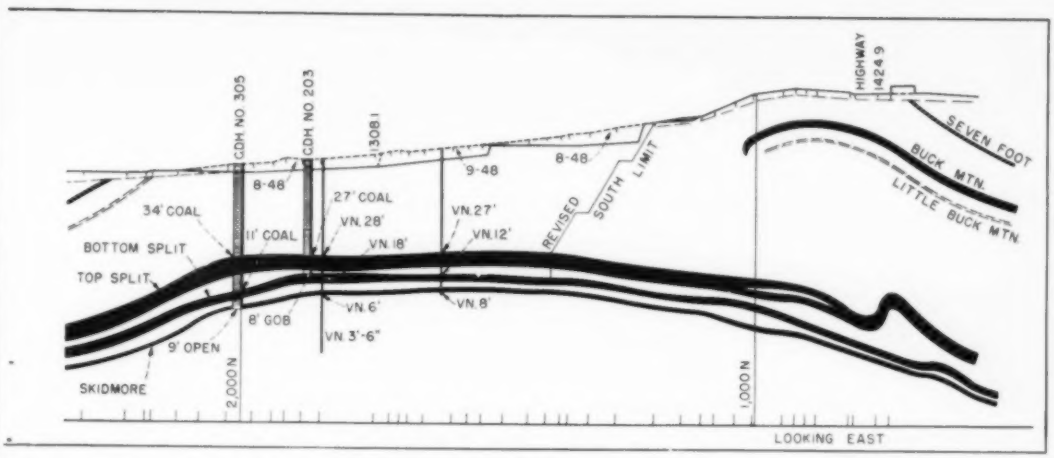
FIG. 2—PLAN VIEW OF THE SHEN-PENN STRIPPING, incorporating the progress report of Dec. 1, 1948.

TABLE I—Shovel Descriptions and Operating Schedules

Order on Job	Make and Type		Capacity, Cu. Yd.	Power	Convertible to Dragline	Shift Schedule Rock	Coal
1	P&H	1400	4	Electric	No	3	..
2	P&H	655-B	1½	Diesel	Yes	..	1
3	P&H	1600	6	Electric	No	3	..
4	Bucyrus-Erie	170-B	6	Electric	No	3	..
5	Bucyrus-Erie	170-B	6	Electric	No	3	..
6	Bucyrus-Erie	120-B	5	Electric	Yes	2	1
7	Bucyrus-Erie	120-B	5	Electric	Yes	2	1
8	P&H	1600	6	Electric	No	3	..

Buda diesels. Most of the engines are Model 844 six-cylinder 225-hp. supercharged units. Some of the trucks are provided with Model 1125 eight-cylinder 240-hp. (non-supercharged) engines. All truck units include hydraulically powered steering with mechanical control.

The preparation of the overburden at Shen-Penn is a difficult problem, since much of the material is sandstone or conglomerate. Then, too, only moderate charges of explosives may be used because of the town near by. The overburden material for the entire project is class-



where the Bottom Split of the Mammoth and the veins above are being stripped.

ified as follows: sandstone, 38 percent; conglomerate, 14 percent; slate, 37 percent; clay, 11 percent.

All churn-drilled holes are drilled to a depth of 30 ft. to insure a full 25-ft. bench cut for loading. At present, 21 Model 42-T 9-in. Bucyrus-Erie churn drills are in operation—four diesel and 17 electric. These operate in fleets of three or more units. It requires three to six drills to keep one shovel running, depending upon the nature of the overburden. The 9-in. holes are drilled on 18- to 20-ft. centers each way. All drills are operated two seven-hour shifts each day and, generally, two men are assigned to each drill. To date, the drill bits have averaged 33 ft. of hole.

Jackhammers Break Boulders

Jackhammers, supplied with air by two portable Worthington compressors, are used to help break the boulders occurring over the coal in some areas of the stripping. Each jackhammer is equipped with a Venturi-tube dust exhauster to protect the operator from the dust.

An Ingersoll-Rand Quarrymaster drill, capable of drilling 6-in.-diameter holes, is used primarily for spot-drilling assignments. The manufacturer is supplying various bits for experimental drilling tests. At present, a Carboloy (Carset) bit is used on the Quarrymaster and the 6-in. holes are spaced on 14-ft. centers, both ways.

A description of charging and firing of blastholes must be preceded by a discussion of a fire that has been burning at this property for 16 years. As previously mentioned, this fire has increased the difficulties involved in loading blastholes, in addition to providing some interesting problems on its own.

Fire Still Burns Underground

On Dec. 31, 1932, when the coal was being mined underground, a fire was discovered in one section of the Skidmore workings. It spread rapidly through gangways and up rock holes to the veins above. Now, as the area is being stripped, it develops that the fire burned only through the rock formations sandwiched between the veins lying above the Skidmore. As the hot red-colored rock is removed, the coal is exposed unhurt by the fire. Not even its usual glossiness appears to have been altered by the heat.

Visitors, feeling the heat of the ground through their shoes and witnessing the vapor rising from fresh drill holes, wonder how the rock could burn without destroying the coal alongside. Some authorities have ventured the explanation that the fire burned through the rock because it was more porous than the coal. They believe, too, that perhaps methane, oil in the rock and the very slight amount of volatile material in the coal have contributed to the feeding of the fire. Temperatures of as much as 800 deg. F. have been measured in the drillholes.

The fire area is about 600 ft. wide, 1,500 ft. long and 200 ft. deep. About 3 million cu.yd. of overburden have been swept by the fire and upwards of $6\frac{1}{2}$ million cu.yd. will be moved in the next two years before this condition is eliminated. The fire has made the rock easier to shoot but, because of the dust, it is more trouble to load with shovels.

Most of the drillholes are loaded with 250 to 300 lb. of Atlas Exdyn, Hercules Titan B or du Pont Nitramon explosives. At least 18 ft. of stemming is used in each 30-ft. hole. At Shen-Penn, the footage of stemming used per hole is at least equal to the spacing between holes. Much of this stemming material is taken from old breasts and gangways as they are exposed in the strip pits. Years ago, when underground mining was in progress, these passageways were slushed with fine waste material to help prevent subsidence. This material is excellent for stemming.

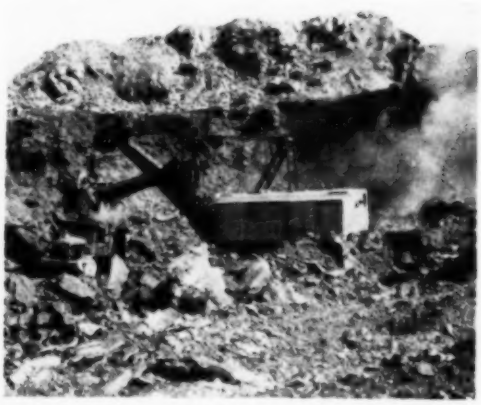
Split-Second Shooting Utilized

A Model 2A split-second timing and blasting machine (Laboratory Associates, Inc., Belmont, Mass.) is used at Shen-Penn for firing the blasting charges from a 110-volt a.c. supply. Split-second shooting of dynamite charges is effective in minimizing blasting tremors, and the more accurate the timing the better. The instrument will accommodate as many as 20 firing circuits. A sweep contact arm, geared to a synchronous motor for timing accuracy, energizes each circuit in rotation from the 110-volt supply. The time interval between points is selective—20 or 28 milli-second (0.020 or 0.028 seconds).

As many as 40 electric detonators, wired in series, may be wired on a point. An additional delay may

Shen-Penn Equipment Planned for Efficient Production

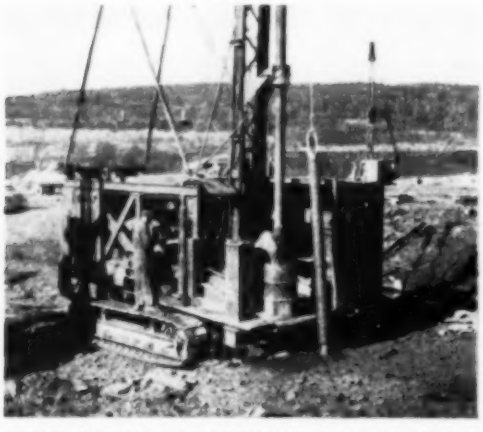
THIS 1½-YD. SHOVEL, a single-shifted diesel-driven unit, is loading coal from the Holmes vein.



LOADING OUT BURNED ROCK from the fire area alight since 1932. The fire burns only the rock, leaving the coal unhurt.

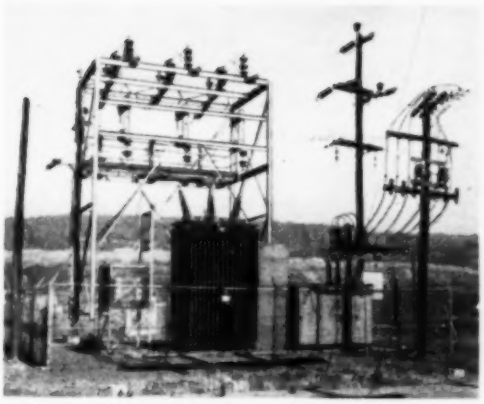
AN UNDERPASS ON ROUTE 45, now in use, permits coal trucks from the eastern area to cross under the highway and dump at the St. Nicholas central breaker.

BLASTHOLES ARE DRILLED to a depth of 30 ft. to insure the taking of a 25-ft. bench. Boulders are drilled by air drills (foreground) operated from a portable compressor.

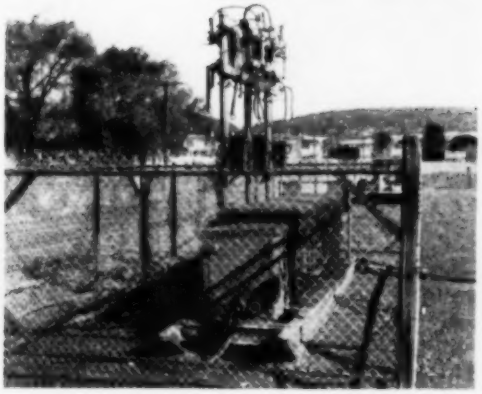


TWENTY-ONE 9-IN. CHURN DRILLS (17 electric, 4 diesels) help prepare the overburden.

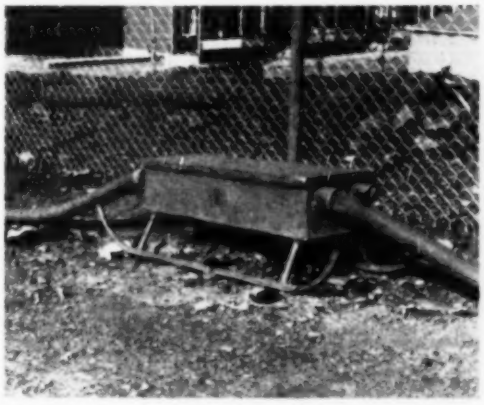
A SELF-CONTAINED AIR-OPERATED DRILL, capable of drilling 6-in.-diameter holes, completes spot-drilling assignments.



ONE 3,000-KVA. 69/4.16-KV. SUBSTATION serves the requirements of the entire Shen-Penn operation.



THE 4,160/440-VOLT PORTABLE DRILL SUBSTATIONS include lightning arresters and primary and secondary overload protection.



STEEL JUNCTION BOXES are used on the 4/0 4,160-volt distribution circuits, which will be further sectionalized with factory-made switch houses having "donut" current transformers.

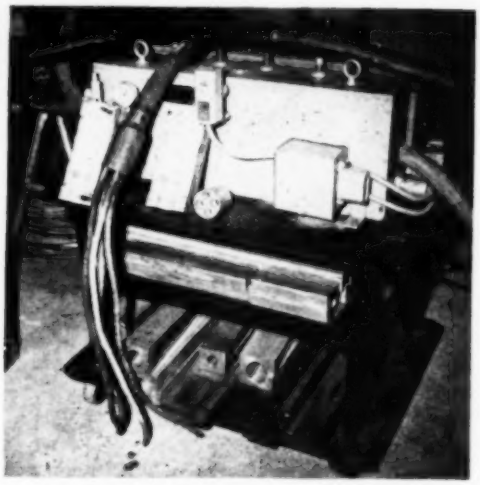
SEISMOGRAPHIC RECORDINGS are made by Robert W. Ruff, junior engineer, during the firing of blastholes. Displacement is limited to 0.03 in. at the nearest dwelling.

FIELD WELDING UNITS are dispatched to field equipment in need of repair.

WOODEN CLEATS FASTENED TO THE BOOM protect it from licks by the dipper.

Electrification and Maintenance Geared to Production Needs

CABLE TESTER PROVIDING 15,000 VOLTS D.C. from 110, 220 or 440 volts a.c. effectively locates "open circuits."

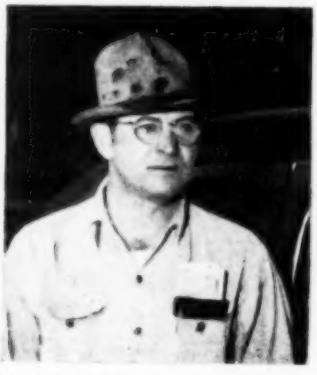


RUBBER POTHEADS AND SPLICES are vulcanized in this machine in Shen-Penn's electric shop.

FRED C. PEARSON, chief electrician, flanked by the cable tester on the left and the cable vulcanizer on the stand.

JOHN W. DAVIES, blasting engineer (left); ROBERT W. RUFF, junior engineer.

EMIL R. ERMERT, chief engineer.



WILLIAM R. KANE, supt. of maintenance.

PAUL SCARLATO, general foreman.

be introduced by skipping points, such as using every other point, or perhaps every third point. However, too much delay between blasts spoils the effect of split-second firing and approaches the condition of firing an isolated charge.

A self-contained, low-energy, galvanometer-type circuit continuity tester, with circuit-selector switch, is another feature of the machine. However, the principal advantages of the blasting machine are the accuracy of the timing interval and the amount of power available for detonating the electric caps.

Ground Displacement Checked

A Model 2 three-component Leet seismograph, operated from a 115-volt a.c. power supply, is used to record the ground displacement, which at the dwellings closest to the stripping area is limited to 0.03 in. or less. An electronic converter (6-volts d.c. to 115-volts a.c.), working off an automobile battery, furnishes the seismograph with power.

The drillholes in the fire area have to be cooled by flooding with water before they can be loaded. Those drilled in broken ground will, of course, not hold water and, therefore, cannot be cooled and charged. The charging and shooting of holes in this area is done quickly. As many as 20 holes have been loaded, stemmed and fired in a 15-minute period.

Wire mats, usually 8x8 ft. and woven solid from old ⅝-in. discarded elevator cable, are placed over some drillholes by the churndrill operator before the blasts are fired. The mats have proved very effective in stopping the flight of rocks and pebbles from the blastholes.

Most of the shovels, as noted, operate on 4,160 volts. Most of the churn drills are fed from 4,160-460-volt field transformer stations. One 3,000-kva. 69-4.16-kv. substation with metalclad switchgear units and grounding resistor serves the entire Shen-Penn project.

Type SHD 5,000-volt cable (American Steel & Wire and General Cable) is used on the 4,160-volt circuits at Shen-Penn, with Type G 600-volt cable on the 440-volt circuits. Cable splices and rubber potheads are vulcanized in a Type 5 GAC Mines Equipment cable vulcanizer.

The newest addition to the electrical testing equipment is the "Thumper" for locating faulty insulation on trailing cable. The "Thumper" causes a sound like a pistol shot to occur at a fault in the insulation of a cable conductor. Hence the trouble is detected by sound rather than by instruments. Shen-Penn purchased the first commercial unit sold by the Electrical Distributors Co., of Philadelphia. Similar units have been used by a large eastern power company with marked success for four years.

The "Thumper" is arranged to operate on 110-, 220- or 440-volt 60-cycle a.c. power. Only about 700 watts is required for operation. Therefore, it can be energized from a portable power supply such as a gasoline-driven generator or storage batteries with a vibrator and a transformer. The tester is readily portable since it weighs only 200 lb.

Cable Tester Versatile

Using a transformer, electronic tubes, condensers, etc., the a.c. voltage is multiplied and converted to a d.c. at 15,000 volts. This is adequate for testing cables rated between 600 and 15,000 volts. Lower voltages should be used on communication circuits and apparatus such as motors, transformers, controllers and relays. In addition to the impulse output of the "Thumper," a steady d.c. voltage is available for breaking down incipient faults and for proof testing after repairs.

The instrument is simple to operate. The illustration elsewhere in this article shows (left to right) the power input and output leads, respectively. The input leads are plugged into the proper sockets in the side of the case, depending upon the a.c. supply voltage, and then are connected to the source of power for operating the tester. The lead on the extreme right is the high-voltage output lead, while the middle lead is connected to ground.

After the "Thumper" is connected, it is energized by raising the knob (left top of the set) into position, as shown. When the tester is operating properly and the thump is occurring at the fault, a fat arc occurs simultaneously at a sphere gap in the tester. The gap is visible through the plastic panel on which the two knobs are mounted. The length of the gap is adjusted by turning the knob on the right until the arc occurs at the desired interval of one to two seconds. After the fault has been located, the left knob is dropped down against the panel. This deenergizes the set or tester, and short-circuits the output and the cable under test. The leads can then be safely removed and coiled for carrying.

Truck Servicing Systematized

The Euclid trucks, under the direction of William R. Kane, superintendent of maintenance, are washed with high-pressure water once a week. They are thoroughly cleaned with a Steam Jenny prior to painting every two years.

Each truck is greased every fifth day. Therefore, with a fleet of 65 trucks, about five trucks are greased each shift around the clock. Crankcases are drained and oil filters are changed every 80 hours. The average life of a new engine is 5,000 hours before overhaul, and the life expectancy of an overhauled motor also is 5,000 hours. Three mechanics can take out an engine and install a new one in seven hours. However, the engine is given a two-hour run-in test to make certain that it and all the auxiliary equipment on the truck are functioning properly.

As of Dec. 1, 1948, 12,844,000 cu.yd. of overburden had been moved at Shen-Penn and 1,061,000 gross tons of rough cleaned coal had been recovered. As far as the removal of overburden is concerned, the project is about 19 percent completed.

Supervisory and Operating Personnel
The Philadelphia & Reading Coal & Iron Co.

Philadelphia, Pa.

Ralph E. Taggart, President

Pottsville, Pa.

George A. Roos, Vice President (Operations)
Edward G. Fox, General Manager
Edward A. Lynch, Director of Personnel
William C. Muehlhof, Chief Engineer
Charles E. Brown, Mining Engineer

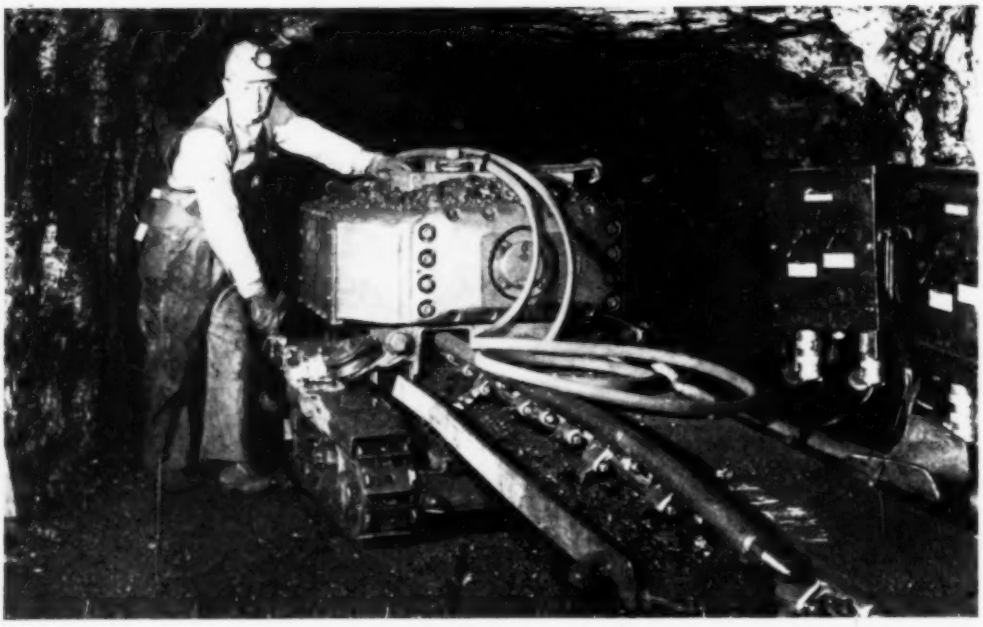
Division Office, Mahanoy City, Pa.

Thomas V. Monahan, Division Superintendent
Frank J. Meyer, Division Engineer

Supervisory and Operating Personnel
Shen-Penn Production Co.

Operating Office, Shenandoah, Pa.

George J. Clark, President
Charles W. Fair, Secretary-Treasurer
Emil R. Ermert, Chief Engineer
Joseph Petusky, General Superintendent
William R. Kane, Superintendent of Maintenance
Fred C. Pearson, Chief Electrician
John W. Davies, Blasting Engineer

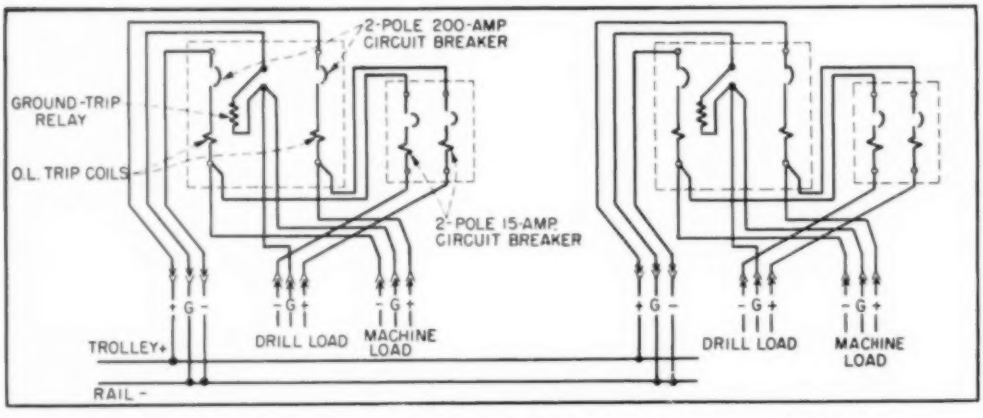


TWO CIRCUIT-BREAKER units serve each shuttle-car unit at Washington and Morrison mines. This view, in Washington mine, shows a typical unit set-up and one of the machines protected.

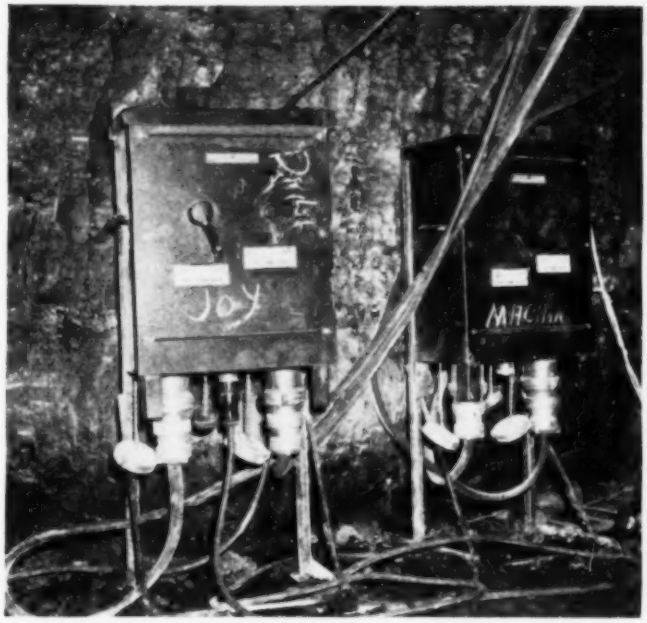
Breakers Protect Face Units

Circuit Breakers With Ground-Trip Coils Protect Men and Prevent Equipment Damage at Mines of the Clayton Coal Co.—Tamperproof Construction Supplemented by Use of Small Separate Breakers for Drills

POSITIVE PROTECTION for both men and equipment in shuttle-car sections has been assured by the use of circuit breakers with ground-trip coils at the Washington and Morrison mines of the Clayton Coal Co., in the Denver basin of Colo-



CIRCUIT DIAGRAM showing operation of a two-unit breaker installation for protecting men and equipment.



TWO-CIRCUIT-BREAKER set-ups at Morrison mine. In addition to the main breaker, each box includes an auxiliary drill breaker.

rado. Made to Clayton specifications, the units are designed for location in fresh air and feature dust-tight construction, light weight and low cost—the latter reflecting, in part, fresh-air location and operation.

Each circuit breaker at the two mines takes care of a loading or cutting machine and each unit, in addition, is fitted with a smaller auxiliary breaker for service to drills. Shuttle cars are powered by batteries, which accounts for the fact that breakers are not required for them as well.

A Breaker for Each Machine

Both Washington and Morrison are shaft operations, in common with all other mines in the Denver basin. Morrison is the older of the two properties and is presently being operated with one 14BU loader and two 5-ton 42D shuttle cars. Two production units serve Washington mine. Each consists of an 11BU loader and two 42D shuttle cars, with capacity built up to 6 tons by sideboards. As previously noted, the cars are operated by batteries.

In addition to the loader and shuttle cars, each unit at both mines includes a 50-hp. Sullivan 7B short-wall with 9-ft. bar carried on a T-2 crawler truck, 2-hp. Chicago Pneumatic hand-held drill and a car-loading elevator.

D.c. power for operation at Morrison mine is taken down from conversion equipment on the surface and is distributed by 500,000-cir. mil feeder, with No. 4 cable to the sections, both reinforced by No. 6 trolley. A portable rectifier serves the equipment at Washington mine and, since it can be kept close, service to the sections is via No. 4 cable.

Protection a Major Goal

While the conventional solid ground would have satisfied the requirements of the safety code, the Clayton management, including John Sidle, general superintendent, felt that preventing damage to loaders, cutters and drills as a result of overloads, shorts and arcs, also was a goal well worth working for. Their search for equipment that would accomplish both purposes, and that at the same time would be low in cost, light in weight and easy to handle, resulted in the development of the breaker units now in service.

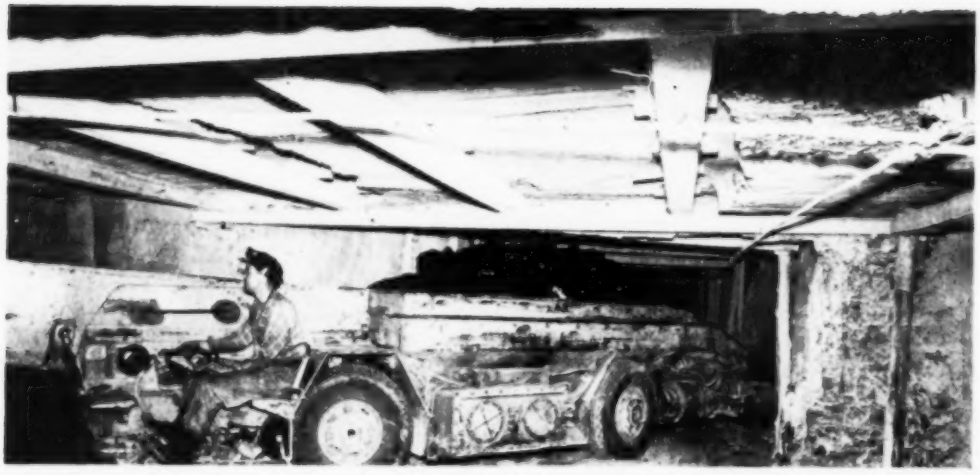
Each breaker unit comprises a General Electric Type AH-1 225-amp.-frame-size breaker with 200-amp. trip coils, a Trumbull Type ATB 15-amp. breaker and a 5-amp. ground-trip coil serving both breakers, which cannot be tampered with and which provide both thermal and magnetic trip. Operating voltage is 250 d.c. Plug connectors for incoming and outgoing power cables are fitted with screw rings so that they cannot be pulled apart. Without stand, weight of a unit is 150 lb. and dimensions are: height, 24 in.; width, 20 in.; depth, 10 in.

Auxiliary Units Guard Drills

Each unit takes care of a single loading or cutting machine. The 15-amp. auxiliary breakers in each are for drill service, relieving the main breakers of the responsibility of the drill load and providing a breaker more suitable for that service. Under the Washington and Morrison set-ups, therefore, two breaker units are installed side by side, one serving the loader and the other the cutter. The drill can be plugged into either of the two units as desired.

The circuit set-up for the normal two-breaker installation is shown in the accompanying drawing. The machines are served by Type G flat cables—two No. 2 conductors and a third ground wire. Drill service is through No. 12 round cable—two conductors with third ground wire. The ground wire from the machine frame is brought back to the 5-amp. trip coil and then goes on to the rail or other ground connection. Through this relay a ground to the machine frame results in practically instantaneous tripping of the breaker serving it, whether it be loader, cutter or drill, thus protecting the operators. Incidentally, since the car-loading elevators at Washington and Morrison naturally are on the rails, protection is by the conventional solid ground from frame directly to said rails.

Providing thermal and magnetic trip, the machine and drill breakers also prevent damage to equipment and the possibility of fires through arcs or shorts. The units went into service in June, 1948, and, shortly after their installation at Morrison, saved their cost, or more, in preventing severe damage to a cutting machine as a result of a short. Since the breakers are totally inclosed and cannot be tampered with, they are always on the job and ready to function as they should. To help find shorts in cables, it is planned to sectionalize them with plug-type connectors.



PIN TIMBERING ON TURNS and approaches permits operator to cut corners without endangering roof support. Every shuttle car is equipped with gong and lights. Translucent drop curtains enable driver to spot pedestrians.

Safety With Shuttle Cars

Mining Methods Adapted for Better Safety in Nine-Entry System—Pin Timbering on Haulageways and Turns and Helps for "Buggy" Operators Keep Accidents Down—Good Supervision Is a Prime Factor

By K. K. KINCELL
Superintendent, Mine No. 63, Consolidation Coal Co. (W. Va.)

SHUTTLE CARS, like any other type of new mechanical equipment, introduce new hazards into coal mines, but a conscientious management, on the alert for ways to make new equipment safer and adapt mining methods to the new problems, can meet the challenge of new dangers and keep the accident rate

Abstract of a paper presented to the Coal Mining Section, 1948 Congress of the National Safety Council.

SAFETY ON HAULAGEROAD STRAIGHTAWAY is provided by pin timbering with 6-ft. wood ties serving as sleepers for crossbars. Spillage on roadways is cleaned up daily.

POSTS ARE ELIMINATED on turns by twin pins supporting a 21-ft. H-beam.

DUAL CONTROLS AND TWIN SEATS enable shuttle-car operator to face direction of movement. Hand-hold and "dead-man" accelerator are added safety features.

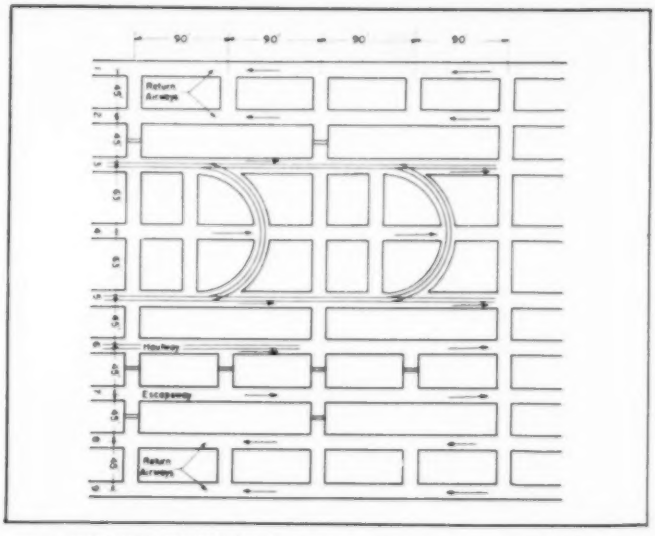


FIG. 1—NINE-ENTRY MINING PLAN provides escapeway on a separate split of intake air, eliminates doors and reduces ventilation control checks to a minimum.

low while boosting efficiency at the same time.

With the introduction of the shuttle car for use in trackless mining, new and improved methods of mining were put into effect at Mine No. 63, Consolidation Coal Co. (W. Va.), Monongah, W. Va. These new methods, used in a nine-entry system of development work, permit us to eliminate all doors, both on our shuttle-car roadways and on our main-line haulage. At the same time, the new system reduces the use of ventilation control checks, or drop curtains, to a minimum.

We direct the air through the five entries in the center of the section (Fig. 1) and split the air at the face, directing the return current back through the remaining two entries on either side of the section. These nine parallel headings provide us with sufficient productive territory, while at the same time they have a safety feature all their own. The two extreme left-hand headings, called No. 1 and No. 2, and the two extreme right-hand headings, called No. 8 and No. 9, are used for return entries. No. 3 is used for the empty track. No. 4 is the discharge point for shuttle cars, No. 5 contains the loaded track, and No. 6, to be used eventually for the main-line track, contains the supply track.

The main safety feature of this mining plan lies in Entry No. 7, which is an emergency escapeway containing a separate split of intake air. In the event of fire anywhere along the main line, the crew can safely walk in fresh air all the way from the face to the surface.

Since our shuttle cars are cable-operated, there is always the possibility of fire from the electric cables. To prevent any such fire from getting out of hand, we have welded on each shuttle car near the reel compartment an easily accessible steel box, with a hinged lid, containing about 50 lb. or more of rockdust. There is also a 1-qt. fire extinguisher. Supplementing these on-the-equipment fire-fighting devices, we maintain two gas masks, a 20-gal. Carboloy extinguisher which can be pulled anywhere by two men, and a mine car containing about 125 80-lb. bags of rockdust in each section. Throughout the section, the water system used to allay the dust while cutting and loading also can be used for fighting fire if needed.

Shuttle cars create a traffic hazard somewhat similar to that encountered on the streets of our cities—namely, the danger of hitting a pedestrian. To eliminate the possibility of shuttle cars hitting or running over workers, we have educated all employees to watch for the cars and give the car operator the right-of-way wherever and whenever possible. Each car is equipped with a gong, which the operator rings at all turns and drop curtains. To date, we have experienced no injuries involving pedestrians and shuttle cars.

We are using a translucent woven-glass material with a resin coating on both sides for drop curtains. To show how light penetrates this material, printing can be read through the curtain if in direct contact. The fact that all workers and equipment carry lights means that the shuttle-car operator can practically see a man or a piece of equipment on the other side of a curtain. The material is yellow rather than white and thus contrasts sharply with the white rock-

dust coating spread over the coal.

Good housekeeping pays off in any industry. We find that clean working areas and roadways help us to keep shuttle-car haulage accident-free. Water lines, which necessarily must be installed overhead, are carefully put up. No protruding hangers or sagging pipelines are left for the car operator to bump his head on. As they finish each job and before they move on to the next, timbermen store post ends carefully between the roof-support legs and the rib. Spilled coal is cleaned up in each place daily. Shuttle-car roads are kept as free as possible of ruts. This type of cleanliness permits the shuttle-car operator to give his undivided attention to the operation of his car, without having a multitude of man-made hazards to contend with. We would like to have, as near as possible, a super-highway to operate shuttle cars on, not an obstacle course.

The thickness of the coal is about 8 ft., with 12 in. of drawslate overlying. After a few days of exposure, or sometimes a few hours, this drawslate disintegrates and falls. Leaving from 8 to 12 in. of coal helps to prevent this. In addition to this head coal, wood crossbars are set on 5-ft. centers, supported by wood posts on each end. However, there is an ever-present danger that some erratic maneuver by the shuttle-car operator may knock these supporting posts loose, letting the bars and sometimes the head coal and drawslate fall.

Pin Timbering for Safe Turns

We have given a good deal of thought to this hazard. Since the posts at and near intersections are the ones most likely to be knocked out, we have eliminated them by pin timbering. In 14-ft. headings, this is best accomplished by using a 21-ft. bar for a carrying bar. A 5-in. H-beam is ideal for this, its 21-ft. length permitting the ends to extend the necessary distance beyond the corners. This carrying bar is supported on each end by two pins made of 2-in. wrought iron 36 in. in length. They extend into the coal 28 to 30 in. to prevent crushing out. Placing the bar on these pins and against the coal, we take advantage of the shearing rather than the bending strength of the pins. This type of timbering at an intersection enables the shuttle-car operator to cut the corner as closely as he wishes without danger of dislodging the roof supports.

We have been trying to adapt some similar type of pin timbering to the entire shuttle-car haulage road. Some degree of success has been attained by using the same 2x26-in. pin and a 6-ft. 4x6-in. wood tie. Drilling two $2\frac{1}{4}$-in. holes on 5-ft. centers in the rib, about 10 in. from the roof, to a depth of 30 in., inserting the pins and then laying the 4x6-in. wood tie on these, we have a good support for the crossbars. This type of roof support requires two crossbars, two wood ties and four 2-in. round iron pins. A wedge is then inserted between each crossbar and the wood ties and is driven tight, making a snug fit between the crossbar and the roof. To make a good job of this method of roof support, all bars must be custom fitted for length and must be installed to utilize the shearing rather than the bending strength of the steel pin.

Protection for "Buggy" Men

Design of shuttle cars is an important factor in safety. Ease of operation and simplicity of control are a "must." Our cars are four-wheel drive, four-wheel hydraulic steer and are equipped with hydraulic brakes. The ease with which a skilled operator maneuvers these cars in the 14-ft. roadways is astounding, especially when we think of some of the antics performed daily by automobile drivers on our highways. The operator's compartment is equipped with dual controls and seats, enabling him to face in the direction of travel at all times. "Dead-man" accelerators operated by foot are used. Noticing that, almost without exception, operators drive their cars standing up when backing toward the loading machine, so as to see over the body of the car, we welded a convenient hand-hold on each car. This one modification probably has saved our men from quite a few accidents that might have been caused by falling off a car or getting a hand caught between a timber and the discharge boom of the shuttle car.

Although his primary job is to produce coal, a supervisor also must have the safety know-how and the ability to issue clear-cut instructions that are easily understood. He must know how to "feel" the attitude of workers toward safety rules and must be able to promote cooperation. He must develop job pride in his workmen, in safety as well as production. He must be able to detect the various moods of his men. A worker whose mind is on his family troubles, financial worries, the night before or the good time he is going to have after work, and whose mind therefore is not concentrated on his work, is a dangerous worker. A good supervisor spots this frame of mind and corrects it quickly.

Human nature being what it is, men will take chances. Safety engineers grant that a man can break safety rules and take chances sometimes without injury, but eventually carelessness will catch up with him and he will get hurt. By constant training, the worker will get into the habit of doing things safely. Once a habit is formed soundly it is difficult to break. It is up to the supervisor, therefore, to see that his workmen form safe working habits.

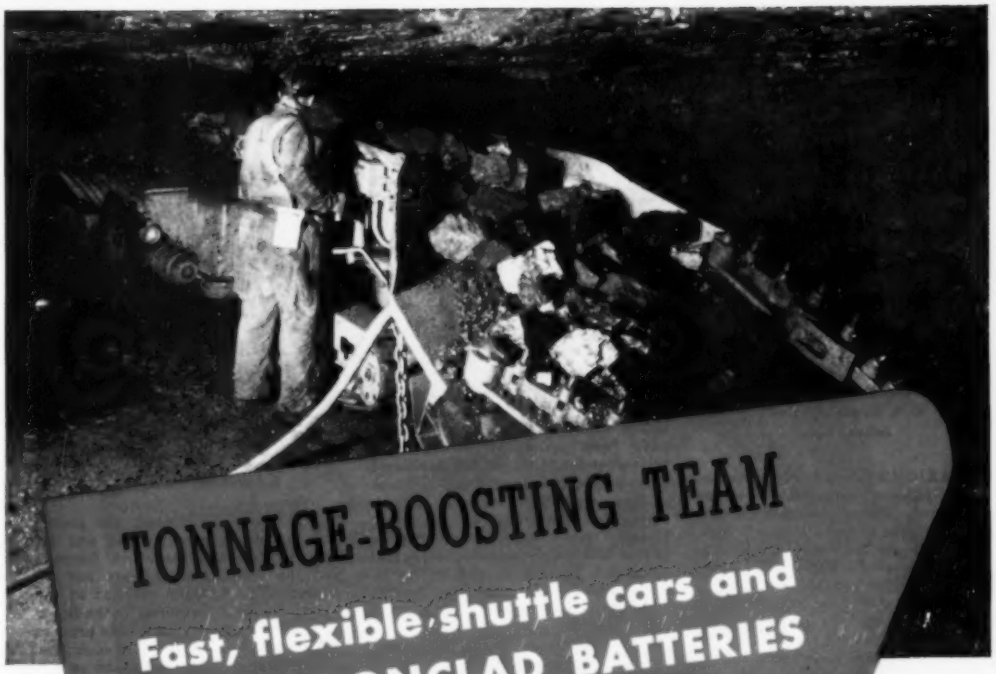
Good labor relations between employee and employer must be developed to promote safety. To get anywhere along these lines requires hard work by the supervisor. Often the tone of his voice in issuing instructions determines whether a job will be done safely. Friendliness toward the workers and the way a supervisor looks at and speaks to his men go a long way toward determining what those men will produce and how safely they will do it.

Teamwork Essential

Supervisors well trained in safety, good labor relations and cooperation between employees and management have resulted in only two accidents from shuttle cars in 18 months of trackless mining at this mine. However, since both of these were compensable accidents, we have been all the more cautious and safety minded. We mined 1,071,000 tons of coal during this period and had 93,826 man-hours of exposure. The total of all accidents during this period was 36, of which 27 were lost-time accidents. Shuttle cars accounted for only 0.75 percent of these accidents.

Summing up, the following principles are a big help in preventing fatalities and injuries from shuttle cars:

1. Safety in the design of equipment.
2. Safety in the timbering methods used.
3. Good housekeeping and cleanliness of roadways.
4. Safety-minded supervision and planning.
5. Good labor relations.
6. Cooperation between employees and management.



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The Foremen's Forum

Systematic Follow-Up the Key To Safety Inspection Gains

By C. H. DODGE
Engineer-in-Charge
U. S. Bureau of Mines
Jellico, Tenn.

IT IS AXIOMATIC that successful industrial plant organizations, including coal mines, have a definite follow-up of instructions issued by the management through the responsible officials to those who execute the plan. Otherwise, misinterpretations, delays, inefficiencies and loss in production frequently result.

A general superintendent once complained: "By the time some of my instructions have passed through the hands of the superintendent, general mine foreman, assistant mine foreman, section foreman and face boss to the workmen for whom the instructions were intended, little was left to the imagination, and I would be hard-pressed to recognize even a small part of my original masterpiece."

The increasing interest of top management, mine officials and employees in safety inspections and the follow-up of the inspector's recommendations testifies to recognition of the desirability of a consistent accident-prevention program. Sincere management interest in safety, manifested by worthy action, engenders the goodwill of employees.

Obviously, the limits of a system of safety-inspection reports and follow-ups are indicated by the size of an operation. However, any time and effort expended on a safety inspection should pay off in a saving in suffering, manpower, equipment, production delays and decreased costs, because the attention of the officials and employees is kept on the known hazards until they have been minimized or removed. Elimination or reduction of hazards is, of course, the first requirement of the job.

The fireboss or mine examiner may be considered the first inspector of a coal mine. The importance of the preshift inspection by the fireboss (mine examiner) and the removal of the dangers he reports cannot be overemphasized. Numerous mine disasters, some of recent origin, could have been prevented through preshift examinations. If the fireboss is employed only as a legal, or face-saving, certified employee, he may react to this subterfuge as can be expected. If the reports of the fireboss are to be reliable and comprehensive, he should be well versed in the requirements of his duties and feel his responsibility for the safety of those under his jurisdiction. Most of the good of the fireboss' examination will be lost unless corrective action is taken by the responsible officials; such action should be shown on their written reports of succeeding shifts. Countersigning the fireboss' report spreads the responsibility to the mine foreman and the superintendent. The day has not entirely passed when a fireboss may forfeit his job if he reports an accumulation of gas in the record book, and, consequently, some firebosses condone the removal of danger signs they have placed before the immediate hazards have been removed.

"Bulls Eye" Spots Danger

One coal company that enjoys an enviable safety record requires each fireboss on finding a dangerous condition in a working place to post a "Bull's Eye" in a conspicuous position immediately outby the hazardous area. The Bull's Eye is printed on $8\frac{1}{2}$x11-in. hard-faced paper; it has a heavy red circle inclosing the word DANGER, the identifying serial number, date and name of the fireboss. Space is provided on the lower part of the sheet to describe the danger (noted as reason), corrective action taken, date and signature of the foreman in charge. The fireboss enters the serial number with a description of the hazard in the company record book, repeating the notation in each succeeding report until the hazard is corrected. The Bull's Eye is left at the mine foreman's office by the foreman in charge of the particular section and then sent to the superintendent's office for further action or filing. The fireboss also keeps a notebook record and makes a daily check of what action, if any, the section foreman has taken. If the danger has not been corrected, he checks again on the following shift and reports to the mine foreman, who then requires an explanation from the particular section foreman. If a place is found producing coal where a Bull's Eye is posted, the fireboss "dangers off" the working place.

Education Sold Plan

When first introduced, the posted Bull's Eyes were torn down and destroyed by employees and foremen and the dangers often were not removed. The foremen rebelled at the corrective action required by the Bull's Eyes because it cut into their production, and the management soon was aware of their attitude toward safety. Educational meetings attended by foremen and firebosses were held at each mine and the management's policy was explained to them. The foremen were informed that they could not discipline the firebosses for posting Bull's Eyes and that the firebosses were responsible for safety only. Production fell as much as 20 percent at first but then rose and in several months recovered and exceeded previous production records. Delays caused by accidents were reduced. When a fatal or serious accident occurs on his section, it is a fireboss' duty to accompany the safety committee, consisting of mine officials and employees, to the site. A description of the conditions in the working place before the accident also is his responsibility.

A recapitulation of Bull's Eyes is made every three months in the superintendent's office, with an analysis compiled by section foremen. Some firebosses are more inclined to post Bull's Eyes than others; a maximum of 12 and an average of four are posted each shift by them. The general tightening-up of regulations at this mine was reflected favorably in reduction of both the frequency and severity rates.

The qualifications of a company safety inspector will vary according to company requirements. The company may require that he shall have had experience as an underground official and have served as a superintendent, or he may be chosen with less experience because of his personality, ability and interest in safety.

Abstract of a paper, "Benefits Derived From the Proper Use and Follow-Up of Safety Inspection Reports," presented at the annual meeting of the Kentucky Mining Institute, Lexington, Ky., Dec. 10, 1948.

being expected to add to his limited mining experience on the job. His authority varies—from dealing direct with employees and issuing instructions to them and the foreman for the removal of any hazard to acting in an advisory capacity and obtaining corrective action through the foremen, who alone may issue instructions, except in an emergency. Much can be said for and against these two extremes of company safety policies. The company inspector also may be responsible for other phases of safety, such as are involved in mining methods, ventilation, haulage, etc.

Written Reports Effective

The company safety inspection should be supplemented by a written report of the hazards observed, usually to the management, and if the inspection, together with the recommendations evolving therefrom, is to be effective, management should require the foreman to report in writing the action taken to minimize or eliminate the hazards. A verbal report only by the inspector usually results in a "hit-or-miss" policy based on the personal desires of those in authority, with the result that only a small number of the hazards discovered, primarily imminent dangers, are given any follow-up attention, except when other problems are not of immediate concern.

A specific list of the more common unsafe working conditions and practices to be checked, with space provided to add others encountered, provides a reliable, comprehensive and consistent guide for the inspector. Such a list represents the consensus of opinion of officials of the operating, engineering and safety departments, and sometimes, employee representatives. In making a company inspection report, it is generally more effective to list the hazards under headings as follows: Underground—Timbering, Explosives, Ventilation, Haulage, Electrical, Dust Control, Working Places, Drainage, and Other Unsafe Conditions Observed; and Surface Hazards. A statement, commending an outstanding improvement or general safety practice, will give encouragement to those responsible for it.

Some companies require their safety inspectors to visit each section at least once in four months. Each inspector ordinarily covers one section daily and gives a copy of his notes to the section foreman and the mine foreman. Typewritten copies of his notes also are sent to the superintendent, division superintendent and safety director. If any unsafe condition cited is unusually bad, the safety director remarks about it in a letter to the superintendent, and a reinspection is made within 10 days. If the condition remains uncorrected, the superintendent is visited by the safety director and the division superintendent for an explanation of the delay. A reply covering the correction of specific hazards listed in the safety inspector's report should be required in a definite period of time. Delays should be justified in writing, with a regular follow-up required until the inspector's recommendation is complied with or an accepted amendment to the recommendation is filed. A letter of transmittal of the inspector's report from the management to the operating staff gives added importance to the follow-up.

Another helpful follow-up is the inspection report of each assistant or section foreman, required at daily or weekly intervals. Weekly or monthly comparisons of these reports may reveal the trend of dangerous conditions in each section.

A practice, introduced during the recent war, of the company inspector handing the employee an "Unsafe Practice Card" or a "Commended Safety Practice Card," merits continuation in a suitable form. A record was kept of these individual cards.

Rating System Promotes Interest

At some operations a standard rating sheet also is used, on which the company inspector charges points for unsafe or substandard conditions against each section. Using the total points possible to charge as a basis, he computes the section rating from his observations during his inspection. This rating system has developed a wholesome spirit of competition between sections of a mine, among both employees and foremen, and a goal of "beat the average." Such a system also is applicable to the surface plant. A general "Inside and Outside Rating Sheet," filled out by the inspector, is useful in comparing the gain or loss in the substandard items listed. Copies of the rating sheets are given to the management, posted at conspicuous points, and filed by the inspector. The foreman's efficiency rating is based, to some extent, on these schedules of substandard conditions, and with his record of production costs, determine his qualifications for promotion. Foremen who remain on the honor roll for the year are eligible for the company raffle to determine who will attend the annual meeting of the National Safety Congress for the current year.

Inspections of state mine inspectors, of course, are followed up according to the requirements of the respective state departments of mines and local company policies. Following discussion of unusually bad conditions between company officials and state inspectors, company officials, including company inspectors, usually review the findings and action needed.

For purposes of comparison and to follow up and remove the weak spots revealed by successive inspections, some companies make a recapitulation of the violations of the state requirements for each mine. These records are maintained by the company safety department for the management and aid materially in planning its accident-prevention program.

Discussion Facilitates Action

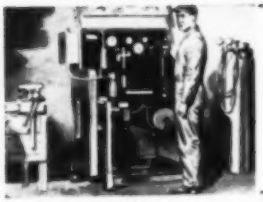
Discussions of observations and recommendations of the federal coal mine inspector often result in immediate action as the inspection proceeds. In a number of states, the state inspectors accompany the federal inspectors during a federal inspection. Following an inspection, a conference is held with the mine officials and management to disclose and discuss substandard conditions. Attending officials should be those who have authority to direct the reduction or removal of hazards discovered during the inspection. A clear understanding of the problems involved and the related actions to be taken are the objectives of this meeting.

Following issuance of the Bureau of Mines' final report of inspection, special letters are sent to the heads of the companies and governors of the states, in which attention is to be called to imminent dangers. Letters of reply have been received from many companies, stating what action has been taken or will be taken and what hazards will be given further consideration. A number of coal companies have the federal inspection reports photostated, or typed copies made, and distributed to their superintendents. Comments of the safety departments usually are added.

Letters of instruction often are issued by the management to the mine officials responsible for carrying out the recommendations, and replies are required within a specified time on corrections made or pending. Some of management's letters of instruction contain recommendations that have been discussed but are not covered directly by the Federal Mine Safety Code.

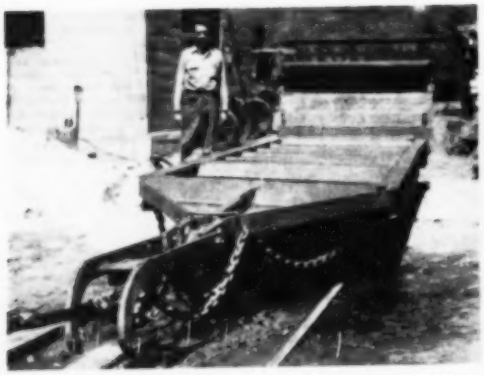
Some companies also recapitulate the recommendations of the federal inspections for the previous year or longer periods, present the figures at their annual or divisional meetings and discuss particularly the repeated violations and recommendations. This often results in the establishment of a corrective plan at a particular mine and the requirements for follow-up action.

Although the policies in effect with various coal-mining companies differ according to the management and local interest in mine safety, the progress in safety at the mines over a period of years is the best evidence of the value of a definite system for follow-up of the safety inspection.

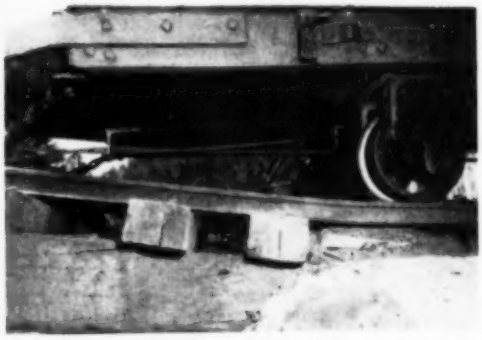


Operating Ideas

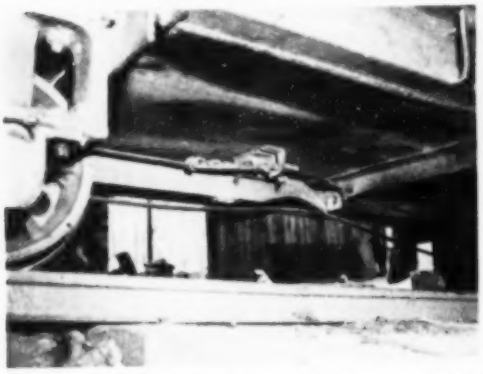
Incline Hoist Equipped With Safety Hooks and Pawls



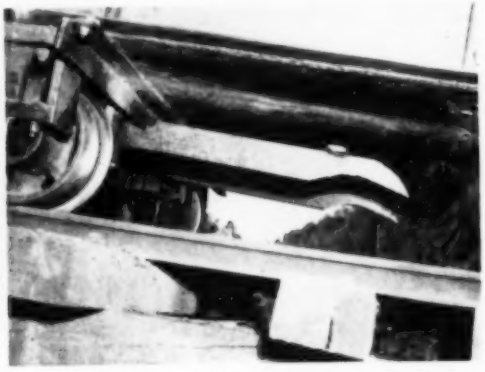
HEAVY FRONT-HOOK ASSEMBLY resting on the hoist rope drops to catch the ties if rope tension slackens. The bottom of the car is constructed "stairway fashion," thus providing seats.



VIEW of the underside of the front end of the car, showing the arrangement of the two ½-in. pawl-tripping ropes and the attachment of the safety chains.



THIS PAWL OR SPEAR under the center of the car is tripped should the hoist-rope hitching fail. The chain ties the nearer ½-in. rope to a pin that drops the pawl. The pin is held in place by two No. 14 copper wires that are broken by tension.



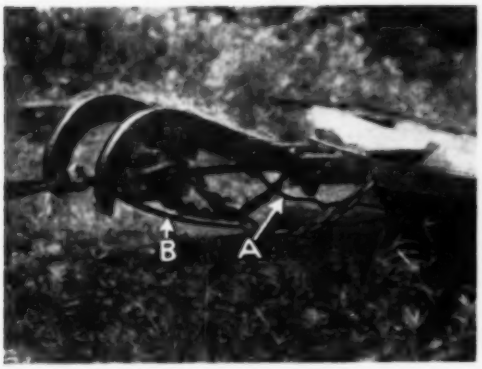
THIS PAIR OF PAWLS or spears under the rear end of the car and held in place by a mechanism similar to that of the pawl under the center of the car is dropped by a ½-in. rope operating independently of the other pawl rope.

PROTECTION for its man-and-supply hoist car is secured with two hooks and three pawls or spears that automatically go into action to engage the ties and stop the descent in case of a broken rope or broken hitchings at Elk Creek No. 1 mine, Elk Creek Coal Co., Emmett, Logan County, W. Va. A pair of hooks on the front of the car, normally held clear of the ties by the tie-bar resting on the rope clamp to which the safety chains are attached, drop and fasten themselves between the ties if there is a slackening in hoist-rope tension below the normal minimum.

A single pawl or spear pivoted at its front end is located under the car at about the center. Also underneath the car near the rear are two more pawls of the same type. All normally are held in the up or clear position by strong steel pins locked in place by two loops of No. 14 copper wire. These wires preclude the possibility of the pawls falling during normal operation of the car.

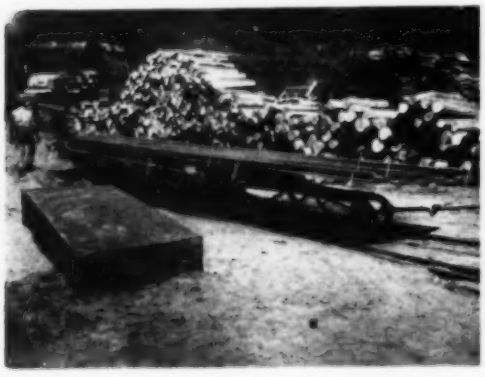
The loops of wire are broken, the pins are pulled and the three pawls are tripped down automatically if the hoist rope breaks at the socket attachment of the car. This tripping is accomplished by two ½-in. auxiliary

Incline Hoist Features Safety Hooks and Pawls



FRONT-HOOK CONNECTIONS—Pawl Rope "A" is clamped to the hoist rope between the car and the emergency chain clamp, and Pawl Rope "B" is clamped ahead of the emergency chain clamp.

CAR ENDGATE shown in raised position for carrying men. After installation of the hooks and pawls, capacity of the car was increased to 20 men, a saving of 25 percent in hoisting time.



LAID FLAT, the endgate adds length to the car for carrying rails, which rest against a vertical flange at its back end.

LOOKING DOWN the incline from the headhouse. The incline is 1,800 ft. long, with a vertical rise of 668 ft.

ropes underneath the car, attached at their rear ends to the trip pins and at the front to the 1-in. hoist rope. The clamp attaching one is just ahead of the socket and the other just ahead of the heavy clamp of the safety chains. Hooks and pawls, 4 ft. long, are made from 1x3-in. steel.

Length of the incline track is 1,800 ft., with a vertical rise above the railroad tracks of 668 ft. The floor of the car consists of a series of steps that provide seats and foot braces for the men. After the car was equipped with the hooks, pawls and tripping devices, permission was secured from the West Virginia Department of Mines to carry 20 men per trip instead of the former limit of 16, thus reducing the total hoisting time by 25 percent.

A hinged endgate is dropped back to a flat position to increase the length of the car for carrying rails and has a vertical flange to keep the rails from sliding over the back end.

John E. Davis, general manager of the company, credits the car design and safety features to D. V. Rozzell, former chief electrician for the company now employed as night chief electrician for an affiliate, the Guyan Eagle Coal Co.

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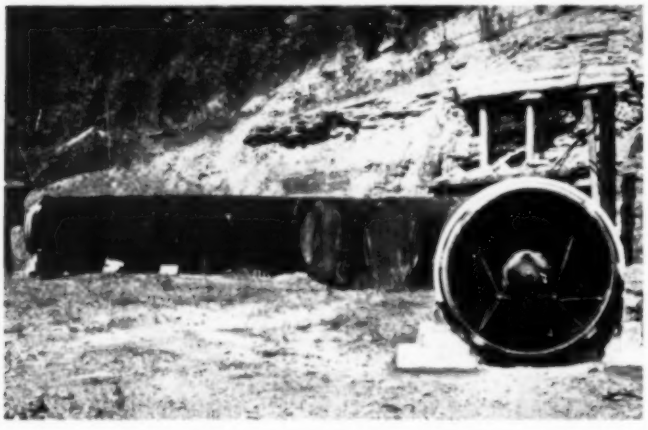
Permanent Fan Adits Utilize Corrugated Duct

CORRUGATED STEEL DUCT and a 5-ft. direct-connected fan is one of three permanent installations at the Amherst Coal Co.



FAN INSTALLATION consisting of two 5-ft. ducts and fans delivers 91,000 c.f.m. at a 1½-in. water gage to Mine No. 1-A, Amherst Coal Co.

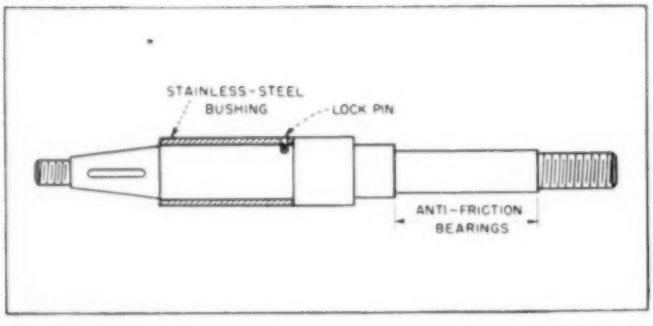
CORRUGATED STEEL DUCTS are being used for fan adits ventilating mining sections expected to have a fairly long life—10 years or more—at operations of the Amherst Coal Co., Logan County, West Virginia. General practice at many operations in the past has been to limit such applications to island-mining or other drift openings with a life ranging from a few months to a few years or, in other words, where frequent reclamation and moving is the custom.

The accompanying illustrations show two of three installations of the Amherst company. Mine No. 3-B delivering to the Accoville plant is ventilated by a single duct and fan delivering 42,000 c.f.m. at a 1-in. water gage, while No. 1-A mine, delivering to the Amherst plant, is served by a pair of ducts and fans totaling 91,000 c.f.m. at a 1½-in. water gage. The installations include 5-ft. Armco coated duct and 5-ft. Hartzell fans with direct-connected motors.

The outside end of each main adit is closed by an Armco corrugated sheet, which is tack-welded to the duct so it will tear off easily and relieve the fan of direct force in case of an explosion. The fan is located at the end of a longer duct branching off the main at 45 deg.

Regardless of salvage and moving advantages, the Amherst management has found this arrangement and equipment cheaper in first cost than the conventional installation that includes a concrete or masonry-protected portal.

Shaft Sleeve Solves Pump Trouble

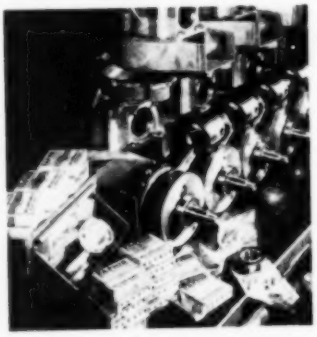


A STAINLESS-STEEL sleeve or bushing was installed on the impeller shaft of a centrifugal pump as shown in the accompanying drawing to withstand the corrosive effects of a slightly acid mine water encountered at a Western copper mine, according to *Engineering & Mining Journal*. After a short period of operation, the original shaft had become so badly worn in the stuffing box that water leaked through the packing and ruined the anti-friction-bearing installation of the pump.

This condition was remedied by turning down ½ in. of the corroded part of the shaft and installing the stainless-steel bushing. The bushing was made slightly long so that when the impeller tightened against the shaft it would press the bushing against its shoulders. As an extra precaution against turning, a ⅝-in. pin was placed as indicated. Since completion of the installation more than two years ago, the only maintenance work that has been required has been replacement of the bushing.

How to Handle Ball Bearings Properly

DON'T PLACE exposed bearings on a rough, dirty bench or use dirty chipped tools.



DO KEEP BEARINGS in original wrappings until needed, work with clean tools.

DON'T HANDLE bearings with sweaty hands. Special protective cream is used at factory.

DO WASH dirty bearings in a clean solvent. Then lubricate them properly.

FEW MECHANICAL DEVICES in volume production today are more highly perfected and scientifically constructed to precision standards than ball bearings. Yet in a shop they all too often are treated not like the fine instruments they are, but like so many nuts and bolts, reports *The Dragon*, a publication of The Fafnir Bearing Co., New Britain, Conn., in suggesting the following steps for proper handling to secure the most in longer life, accuracy, reduced maintenance costs, higher speeds and power economy.

"Dirt" that finds its way into the bearing, often through carelessness before or during assembly, is responsible for most ball-bearing failures. Broadly speaking, there are two classes of such dirt: (1) abrasive, such as emery, dust or sand; and (2) obstructive, such as metallic chips or sawdust. Balls rolling in their races form a contact that often is under high pressure. Consequently, abrasive dirt, which consists of hard particles that are actually embedded in the steel surface and cannot be washed out, when mixed with lubricant makes a very potent lapping compound that destroys the bearing's fitup and accuracy. Obstructive dirt destroys efficiency at the very outset. It produces vibration and impedes normal rotation of the ball, which is conducive to heat, skidding and resulting early failure. The ball separator may rupture, the race become smeared with foreign matter and the bearing may seize.

Ball-bearing manufacturers have invested many thousands of dollars in inspection and wrapping methods and equipment to insure that clean bearings are shipped to customers. Thus, when they are received, it is not advisable to break the seal or unpack each one to check against the packing slip. Bearing numbers are printed plainly on the package. In the stockroom, new bearings should always be placed at the back of the pile so that the old ones will be used first.

The critical point in the life of a bearing is when it leaves the stockroom for the assembly bench—from then on it is at the mercy of the men who handle it. As a preliminary precaution, bearings should not be taken from stock until actually needed and should not be unwrapped until complete preparation for their installation has been made.

The first rule in handling ball bearings is to have clean hands, clean tools and a clean assembly bench—especially if the bench is made of wood. Lay the unwrapped bearings on a clean paper on top of the bench. The slush or grease in a new bearing should not be washed out—it was placed there by the manufacturer for a good reason.

If bearings must be washed—and often those removed during overhaul may be cleaned and repaired for further long service—avoid the temptation to spin the bearing in the hands to see how it runs or sounds, as this practice may result in dirt dropping into the races to scratch raceways and balls. Kerosene may be used for cleaning, although other petroleum solvents, such as Stoddard B, are preferred. It may be necessary to soak a dirt-caked bearing for hours and to use a short-bristled brush to loosen the foreign material. The bearing should be rinsed in clean solvent, dipped in light oil (as solvents tend to leave the surfaces susceptible to corrosion) and lubricated. An air hose may sometimes be used to advantage, but the airline should be filtered and the bearing rings must be kept from spinning to prevent dirt from causing scoring.

Before installation, bearing seats on shafts should be thoroughly cleaned—especially corners, keyways, splines and grooves. Burrs and slivers should be removed. Adjacent parts should be wiped free of chips and filings. A small amount of oil on the bearing seat eases mounting and helps prevent shaft scoring.

Mounting a bearing on an unclean shaft usually results in dirt or chips being trapped between the shaft shoulder and the bearing, preventing accurate or complete seating. The bearing should go all the way to the shoulder smoothly and with uniform pressure, and if it sticks at any point, it may be cocked. Continued force on a bearing not started square is likely to scrape and seriously damage the shaft. A cocked bearing will bind, which means an early failure. Ball bearings should never be forced onto a shaft by pressure exerted on the outer ring, as serious damage may result, especially to the ball raceways.

Shaft shoulders and fillets are as vital to bearing performance as correct bearing-seat diameters. Because many bearings are narrow, abutment against a shoulder is beneficial as the bearing actually is squared up when pushed home against the shoulder. Thus, the squareness of the bearing is determined by the squareness of the shaft shoulder.

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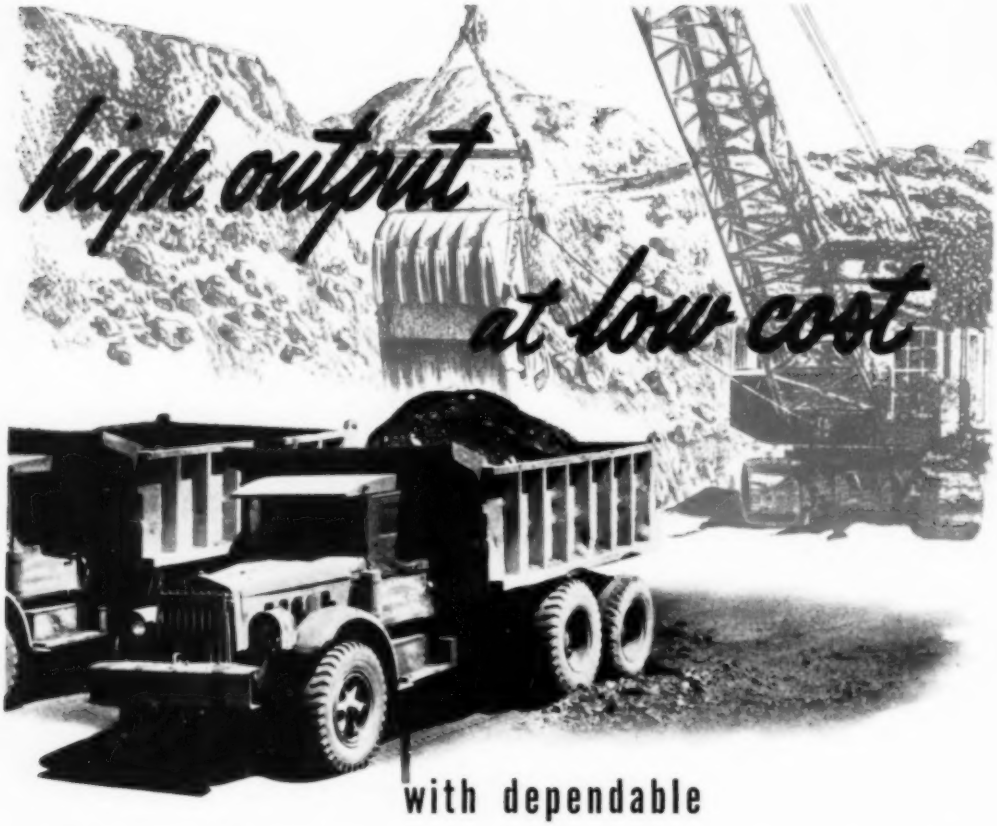

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News Round-Up

Featured in This Section

Peabody Official Named Illinois Mines Chief

James W. Starks, superintendent, Taylorville-Springfield division, Peabody Coal Co., for the past 10 years, last month was appointed new director of the Illinois Department of Mines and Minerals by the new governor, Adlai Stevenson.

Mr. Starks, who began his mining career as a mule driver, has been associated with Peabody for 27 years, holding a number of supervisory positions with the company before becoming district superintendent. He is a member and a past president of the Illinois Mining Institute. At one time, he also was a state mine inspector for four years.

In announcing his intention of appointing Mr. Starks, Governor-elect Stevenson reported that he had consulted the U.M.W.A., P.M.W.A. and coal operators regarding the selection. At the same time, Mr. Stevenson reportedly stated that he would seek to place the mines department under civil service and to have the Illinois mining laws revised to modernize them.

Mr. Starks was reported to have announced that Prof. Harold L. Walker, head, Department of Mining Engineering, University of Illinois, would take a key advisory role in the revision of the state mining laws. He called Prof. Walker, who served as an emergency director of the state department for six months under Gov. Green, one of the "best brains" in the mining field and said that he would work closely with him.

•

N.L.R.B. Examiner Hits Mines' Union Shop Clause

In a ruling released Jan. 19, William R. Ringer, chief trial examiner, National Labor Relations Board, condemned the union-shop provision of the 1948 contract between the U.M.W. A. and the captive mines. The requirement in the contract that miners must be members of the union, or become members, he said, was illegal because a majority of the employees had not authorized the union shop in a government-conducted election. Such an election can be held only when a union has filed certain reports and non-Communist affidavits, which the U.M.W.A. has not done.

If the union files an objection, the examiner's ruling will be subject to a decision by the board itself, and thereafter, might be reviewed by the Circuit Court of Appeals and the Supreme Court, unless the governing provisions of the Taft-Hartley Act are removed or changed.

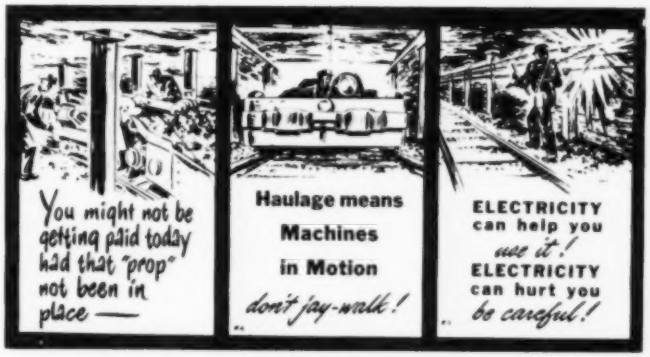
•

Synthetic-Fuels Plants Asked in Congress Bills

Bills to authorize the use of government funds in the construction of synthetic-fuels plants were introduced into both the Senate and the House early last month. Sen. McCarran (D., Nev.) reintroduced his bill authorizing the RFC to finance construction of the plants in conjunction with private industry. Rep. Wolverton (R., N. J.) reintroduced a similar bill providing a ceiling of $350 million on RFC expenditures to encourage construction of plants.

The House bill (HR 566) is the same as that reported to the House by the commerce committee during the second session of the last Congress. It permits the RFC to make loans to business for the construction of an unspecified number of plants, using the Fischer-Tropsch process or the hydrogenation of coal or oil from shale. No specific number of plants is called for and the addition of private financing could result in construction of more than the minimum three. The bill provides that, in the event industry refuses the proferred loans, the RFC can contract for the construction of the plants and their operation by private industry.

The McCarran bill (S 6) is similar in results to the Wolverton bill. It authorizes the RFC to encourage the entrance of private industry into synthetic fuels by contracting to purchase the products of the plants. Should such commitments not be sufficient to encourage development of a private industry, the RFC could construct its own plants, to be privately operated under contract.

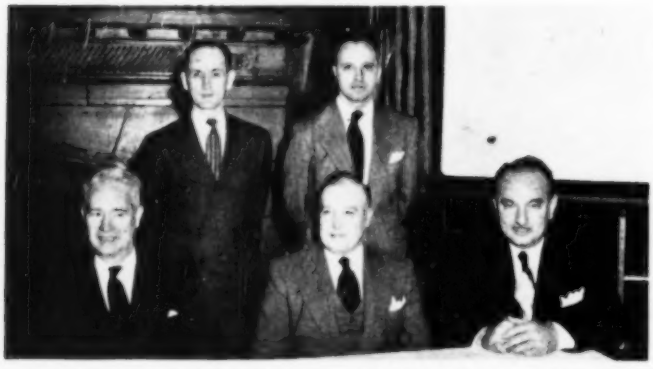


N.C.A. Pay-Envelope Inserts Stress Safety to Miners

THESE THREE front views are typical of the series of pay-envelope stuffers now being used by N.C.A. member companies each payday to remind more than 100,000 miners that their safety also is a personal matter. On the reverse side each slip has the message: "Are you going to be on the payroll next week? There's only one right way—the safe way!" The enclosures, each measuring 2⅜x3¾ in. and printed on varying colored paper, are being supplied by N.C.A.'s safety division.

AT THE OPENING SESSION of the Kentucky Mining Institute—Edwin McGaw (left), personnel director, and Aubin Higgings, mining engineer, West Kentucky Coal Co.; C. H. Dodge, engineer-in-charge, U. S. Bureau of Mines, Jellico, Tenn.; and standing, V. D. Picklesimer, general superintendent, South-East Coal Co., retiring institute president and session chairman.

SPEAKERS at the second session—George Leatherman (left), electrical engineer, Inland Steel Co.; Edward Thomas, mining engineer, U. S. Bureau of Mines, College Park, Md.; C. B. Burchfield, general manager, Black Star Coal Corp. and Pioneer Coal Co., newly elected institute president and session chairman; and John E. Jones, safety engineer, Old Ben Coal Corp.



PARTICIPANTS in the third session of the Kentucky Mining Institute—C. S. Carter (left), professor of mining engineering, University of Kentucky; M. J. Ankeny, chief, Coal Mine Inspection Branch, U. S. Bureau of Mines; Harry Gandy Jr., representative, National Coal Association; J. T. Parker (standing, left), superintendent, Inland Steel Co.; and J. H. Mosgrove, safety director, Big Sandy-Elkhorn Coal Operators' Association.

Mine Safety and Education Featured at Kentucky Meet

WHETHER the 29 tons of liquid carbon-dioxide introduced into the East Diamond mine reduced the sealed time was not conclusively answered in a paper presented at the annual meeting of the Kentucky Mining Institute held at Lexington, Ky., Dec. 10-11. The description of the fire, the sealing and the recovery work was accompanied by a comprehensive graph of the temperature and the gas percentages during the 70-day period that evoked considerable interest at the meeting. Subjects of other papers included safety-inspection reports, sectionalizing breakers, a story of coal, suspension roof supports and coal-mine education. A. D. Sisk, chief, Kentucky Department of Mines and Minerals and secretary-treasurer of the institute, in reporting on mine fires, explosions and recovery work in Kentucky during the past year, stated that most of the fires and explosions resulted from electricity or black blasting powder.

C. B. Burchfield, general manager, Black Star Coal Corp., and Pioneer Coal Co., was elected president of the institute for the coming year. V. D. Picklesimer, general superintendent, South-East Coal Co., Seco, retiring president of the institute, was chairman of the opening and final sessions, and Mr. Burchfield was chairman of the second session. At the banquet held at the Phoenix Hotel, O. W. Evans, general superintendent, N.&W. Ry. Fuel Department, acted as toastmaster and Charles H. Gartrell, commissioner, Kentucky Department of Aeronautics, was the speaker. Entertainment consisted of a floor show put on by a troupe from the University of Kentucky.

Aubin Higgins, mining engineer, and Edwin McGaw, personnel director, West Kentucky Coal Co., Madisonville, presented the paper dealing with the fire in the company's 5,000-ton gassy East Diamond mine. The fire started at or adjacent to the main-haulage belt about 1,500 ft. from the slope bottom at noon on the idle day, Dec. 24, 1947. The belt slope and two air shafts were sealed the next day, with the body of Frank Stokes, a foreman, remaining in the mine. Seals were opened March 4, 1948. On March 26, during the recovery work, the fire rekindled but was permanently extinguished by direct fire-hose methods by April 3.

The 29 tons of liquid CO_2 was introduced through a power borehole close to the origin of the fire during the period Dec. 26 to 29. The open area to which it could spread was 20,500,000 cu.ft. Analysis percentages of the mine atmosphere just before the CO_2 was introduced were: methane, $8\frac{1}{2}$; oxygen, 9; carbon-dioxide, 5; and carbon-monoxide, 6. After the liquid CO_2 was introduced, the content of that particular gas in the

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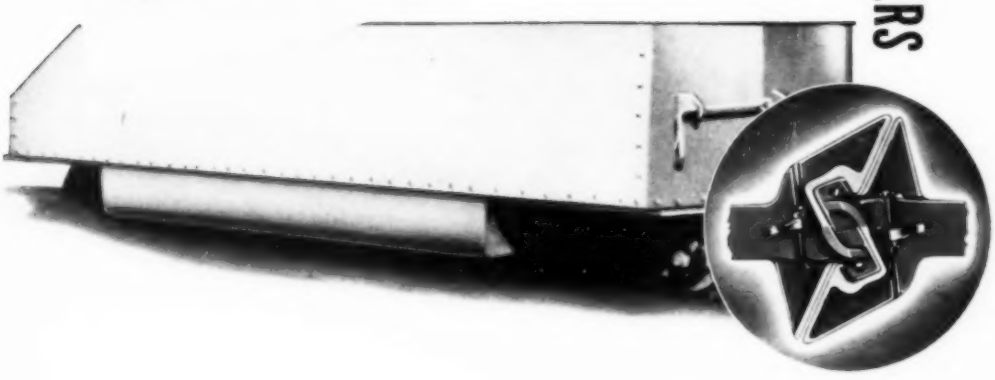

Tonnage increases *per day* as well as *per car* when large cars are equipped with Willison Automatic Couplers.

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Thermoid V-Belts resist moisture-absorption, and both *internal* and *external* abrasion. Internal abrasion of the cotton cords weakens V-Belts, causing stretch and wear. The Thermoid Impregnation Process assures longer belt life by eliminating internal friction and reducing heat. *And Thermoid V-Belts are pre-stretched to insure perfect operation.*

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The Thermoid Impregnation Process insures a deeper penetration of rubber between the threads of the yarn, which encases each individual strand with protective rubber. The rubber acts as a sheath between the strands and prevents the destructive abrasion action as the product is flexed in use. To obtain the required rubber penetration, the twist of the yarn must be to exact specifications. With the yarn twisted too tightly, proper penetration of the rubber compound is impossible. This condition produces abrasion, causing premature failure. On the other hand, if the yarn is twisted too loosely, the product lacks tensile strength. Thermoid has discovered the optimum twist of the yarn which assures maximum rubber penetration and greatest strength. The development of Thermoid Impregnation Process is another step forward in Thermoid's planned program of product improvement, assuring maximum service and lower operating costs to industry through the use of Thermoid Industrial Rubber Products.

1949 OFFICERS
KENTUCKY MINING INSTITUTE

President—C. B. Burchfield, general manager, Black Star Coal Corp. and Pioneer Coal Co., Alva, Ky.

Vice Presidents—Bradley Sparks, vice president, operations, Luzerne-Graham Mining Corp., Greenville; J. B. Marcum, general manager, Blue Bird Mining Co., Hazard; F. P. Kerr, general manager, Eastern Coal Corp., Stone.

Secretary-treasurer—A. D. Sisk, chief, Kentucky Department of Mines and Minerals.

mine atmosphere rose to 12 percent, then fell rapidly for the first week or so, finally assuming a practically constant percentage of about 5 for the last month under seal. Other gas percentages just before the seals were broken were: methane, 41; oxygen, 2; and carbon-monoxide, .01.

Pressure on the seals varied from minus 1 in. to positive pressures, but with a general increase until it reached 18 in. water gage on Jan. 28, when it was relieved by equipping the top of a borehole with a relief valve.

After surface seals were opened, and the main bottom explored, it was decided to build underground seals near the slope bottom so that a 196-ft. air shaft, 750 ft. from the slope bottom, could be used for blowing air into the sealed area. Six boreholes were drilled into headings of the main entry at a point 3,000 ft. from the slope bottom to constitute the return or relief for this ventilating current.

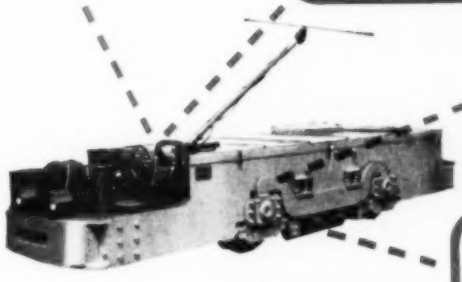
Cause of the fire was an electrical failure of a d.c. power cable in a borehole at a point in the casing about 70 ft. above the coal seam. The lower end of the cable dropped into the mine and the fire started in that area. At the time of this cable failure, the surface substation at the top of the borehole was shut down because of the idle day. The cable had voltage on it, however, from another surface substation feeding through another borehole some distance away, which was in operation to supply idle-day power. Seven of the eight men working in the mine made their way out within a short time after the fire started. The foreman was alone when overcome. The 42-in. belting helped to spread the fire, it was reported.

In conclusion, the authors made the following suggestions: "We think great precautions should be taken to prevent belt fires and we list some things we think worth considering: (1) all power lines other than control lines should be kept out of belt entries as much as possible; (2) power wires over belts should be avoided where possible; (3) power wires under belts should be installed in conduit or pipe; (4) coal dust should not be allowed

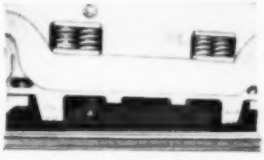
CONVENIENTLY LOCATED air brake valve controls application of air to two equalized brake cylinders. A motor-driven compressor maintains pressure in the reservoirs.

FOR EMERGENCY APPLICATION, and to hold locomotive at rest, standard G-E handbrakes are built to last. Above, precision-built brake rigging and hand-wheel.

YOU GET SMOOTH CONTROL of train speed by dynamic braking. Operator fatigue is also reduced. Above, a G-E Traction D-c motor, heart of the dynamic braking system.



on G-E trolley-type locomotives



AN ADDITIONAL SAFETY FEATURE is provided by the supplemental magnetic track brakes which give sure, positive "grip" on tracks for final braking.

4 WAY BRAKING SAFETY

Air brakes
Hand brakes
Dynamic brakes
Magnetic track brakes

To minimize chances of accident, personnel injury and equipment damage, and to lessen chances of production slowdowns, a four-way braking system is now offered on General Electric trolley-type mine locomotives—a system that operates *regardless* of main power failure or off-wire trolleys.

Besides standard mechanical hand brakes, this system includes air brakes, *plus* easy-to-handle dynamic brakes, and magnetic type track brakes. A 32-volt battery, which is automatically maintained by a motor-generator set with voltage regulator, can energize either the dynamic or magnetic braking system, independent of trolley power.

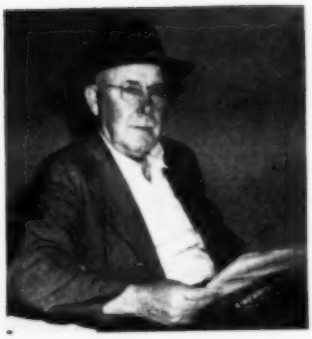
A G-E specialist in mine locomotives will be glad to give you complete information. Call your local G-E office today! ***Apparatus Department, General Electric Company, Schenectady, New York.***

FOR SAFER SERVICE—G-E MINE LOCOMOTIVES

GENERAL ELECTRIC

COAL MEN

R. C. Henderson (left), purchasing agent, Howard J. Thomas, consulting engineer, O. L. Kugler, chief electrician, and W. A. Tinsley, superintendent, Boothon Coal Mining Co., Boothon, Ala.



C. B. Burchfield, general manager, Black Star Coal Corp. and Pioneer Coal Co., Alva, Ky.

J. A. Sanders (left), assistant treasurer, and H. E. Jackson, president, Diamond Coal Mining Co., Caryville, Tenn.

James McDowell (left), superintendent, and Charles Minor, truck foreman, Ken Coal Co., Beaver Dam, Ky.

L. Nifong (left), plant superintendent, F. J. Foresman, personnel manager, and Joe Scott, preparation-plant foreman, Pittsburg & Midway Coal Mining Co., Pittsburg, Kan.

Miles G. Burns (left), analyst and timekeeper, and Orville Runkle, mine superintendent, Pittsburg & Midway Coal Mining Co.

J. B. Gillenwater, superintendent, Thomas and Lorado, W. Va., operations, Bailey Construction Corp.

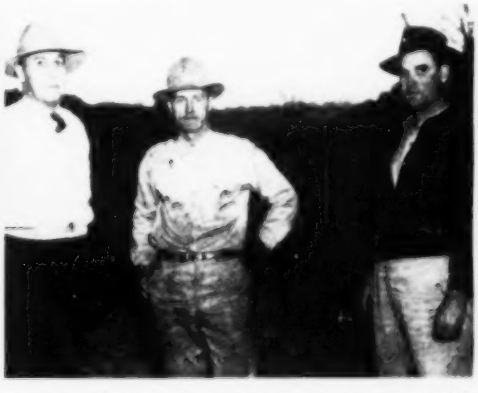
J. R. Liddle (left), chief electrician, C. W. Moore, supply house foreman and truck-coal salesman, Robert H. Smith, supply clerk, Roden Coal Co., Marvel, Ala.; and Mel Martin (standing), salesman, Monroe Hardware Co., Birmingham.

ON THE JOB

Roy Houck (left), shop foreman, and Charlie Courtois, electrical foreman, Hume-Sinclair Coal Mining Co., Hume, Mo.

D. F. Jackson (left), superintendent, and P. P. Pace, bookkeeper Neely Construction Co., Bokoshe, Okla.

L. A. Crump (left), superintendent, and A. P. Massmann, preparation engineer, Broken Arc Coal Co., Okmulgee, Okla.



T. G. Rivers (left), partner, T. F. Medlin, pit foreman, and Clifford Gaither, partner and superintendent, Cedar Creek Mining Co., Stigler, Okla.

MEETINGS

- A.I.M.E.: annual meeting, Feb. 14-17, Fairmont Hotel, San Francisco.
- Southern Coal Producers' Association: annual meeting, Feb. 14, Washington Hotel, Washington, D. C.
- American Mining Congress: coal convention and exposition, May 9-12, Cleveland, Ohio.

to accumulate on belt lines; (5) belts should have all the coal run off of them at the end of the shift; (6) shuttle cars should not be left parked with the end of the car over the belt; (7) fire-fighting equipment should be kept available at all times near the belt; (8) section switches should be on all power lines near belt entries so as to permit cutting off power in any emergency; and (9) place automatic-sprinkler or water lines near belts, with valves not more than 100 ft. apart."

Among the slide exhibits of inspection forms and reports shown by C. H. Dodge, engineer-in-charge, U. S. Bureau of Mines, Jellico, Tenn., with his paper, "Benefits Derived From the Proper Use and Follow-Up of Safety Inspection Reports," were "Bull's Eye" cards used by an unnamed mining company said to have an enviable safety record. The serially-numbered cards of 8½x11-in. heavy paper, each displays a heavy red circle enclosing the word "Danger." In a space at the bottom, the fireboss describes the danger and posts the card at the spot. After the foreman takes action, he makes a note of it on the card, signs his name and leaves the card at the superintendent's office. The fireboss keeps a record by serial number of the location and reason for posting the card and checks daily for corrective action. If the fireboss finds a "bull's-eye"-posted place producing coal, he "dangers it off."

Mr. Dodge also described a number of other successful types of reports for company inspections and for the follow-up of state and federal inspections.

Nine mine fires, four explosions and the recovery of the 20 bodies from Belva mine of the Kentucky Straight Creek Coal Co., Four Mile, Ky., sealed since the explosion, Dec. 26, 1945, were described briefly in a report by Mr. Sisk. The report on fires and explosions covered the 12-month period from Dec. 1, 1947, through November, 1948. Of the nine fires, five resulted from electrical mishaps and four from blasting with black powder. While no one was killed in an explosion in the state, there were four explosions, all traced to the use of black powder.

George Leatherman, electrical engineer, Inland Steel Co., Wheelwright, Ky., said that he was not very optimistic that a circuit breaker, which will open on short circuit, as between conductors of a duplex cable, draw-

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EQUIPMENT APPROVALS

Five approvals of permissible equipment were issued by the U. S. Bureau of Mines in December, 1948, as follows:

Goodman Mfg. Co.—Type 477 power duckbill; one motor, 5 hp., 440 volts, a.c.; Approval No. 2-644; Dec. 2.

Jeffrey Mfg. Co.—Class 48 distribution box; four branch circuits, 250 volts, d.c.; Approval No. 2-645; Dec. 15.

Joy Mfg. Co. (Sullivan Division)—Type 10AU coal-cutting machine; two motors, 26 and 50 hp., 250 or 500 volts, d.c.; Approval's Nos. 2-646 and 2-646A; Dec. 23.

Mine Safety Appliances Co.—M.S.A. face duster; 1-hp. motor, 90, 230 or 550 volts, d.c.; Approvals Nos. 2-647 and 2-647A; Dec. 23.

Goodman Mfg. Co.—Type L-20 shaker conveyor; one motor, 20 hp., 250 volts, d.c.; Approval No. 2-648; Dec. 23.

ing less than full load current, will ever be developed. He illustrated his paper, "Modern Use of Sectionalizing Breakers in Coal Mines," with slides showing a series of diagrams to which he credited the D. C. Mine Sectionalizing Committee. These diagrams provide the best recommendations for circuit-breaker installations he could determine at this time, he said.

Moving circuit breakers closer and closer to the working place is the trend in obtaining the best possible protection under the circumstances. Breakers should be set as low as possible and still permit virtually continuous power, Mr. Leatherman stated. Truly continuous power can be obtained only if the breaker is set to the total of all the connected loads and that would afford little or no protection.

Mr. Leatherman outlined three logical solutions: (1) count on a diversity factor and let experience determine the best overload setting; (2) install a second line of circuit breakers nearer the loads; and (3) install additional feeder and return capacity, thereby increasing the maximum possible short-circuit current. If loads pull face voltage down to 75 percent of the substation voltage without tripping a circuit breaker in the line, it is indicative of trouble and requires remedial action, he pointed out.

John E. Jones, safety engineer, Old Ben Coal Corp., West Frankfort, Ill., a life member of the Kentucky Mining Institute, briefed "A Story of Coal," a paper he prepared in considerable length for publication in the institute's proceedings. The story starts with the sun's energy, continues with the beginning of geologi-

Robins Gyrex Screen gives thrifty, dependable service on same installation since 1933

For more than 15 years the Robins Gyrex Screen pictured above has given low-cost service at the Mohawk Mining Co., Kittanning, Pa.

"It just runs on and on!" says D. H. Turner, Mohawk president.

Such long service is typical of what you can expect from Robins Gyrex Screens. You can use them for a wide variety of sizing or separating jobs—for coal, coke, gravel, stone, sand, rock, ore and many bulk materials.

Developed by Hewitt-Robins, the Gyrex vibrating screen is extremely versatile. It can separate as many as six different sizes at one time. It can size anything from fine hair to coarse rock. And it can handle hundreds of tons of bulk material every hour.

Once *you* install a Gyrex Screen, you will soon discover these five advantages:

1. Smooth operating. Has powerful vibration within itself. Yet *does not vibrate* the building or supports.

2. Versatile. Available in a weight to meet any class of service—a size to solve every problem. More than 300 models and styles.

3. Economical. Uses minimum of power per ton of material screened.

4. High capacity and efficiency. Uniform positive motion and correct centrifugal action.

5. Long life, low maintenance cost. All bearings super-sealed. All permanent connections electric-welded. All service connections jig-drilled for fitted bolts.

ROBINS

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Consult Robins now. There's a Gyrex Screen to meet *your* exact needs.

SEND TODAY for Robins Bulletin No. 115-A. Fully illustrates and describes features, advantages and benefits of efficient Gyrex Screens. Address Robins Conveyors Division, 270 Passaic Avenue, Passaic, New Jersey.

ROBINS CONVEYORS DIVISION **HEWITT-ROBINS INCORPORATED**

1948 COAL AGE INDEX

Because of the continuing limitations on paper, the index to COAL AGE, Volume 53, January-December, 1948, was not bound into the December issue. However, this index has been prepared and is available without charge to any COAL AGE subscriber. Address: The Editor, Coal Age, 330 W. 42nd St., New York 18, N. Y.

cal time and carries on to 1800 A.D. The first record of the use of coal dates back 2,300 years before 1800, and the coal reserves of our planet indicate that we can use coal for another period of 2,300 years, Mr. Jones stated.

Suspension-type roof supports were described by Edward Thomas, mining engineer, U.S. Bureau of Mines, College Park, Md., in a paper that covered essentially the same ground as covered in his paper presented at the National Safety Council (*Coal Age*, December, 1948, p. 173). Discussion brought out the following points: (1) in addition to installations in Illinois, Alabama and West Virginia, there now are a few experimental installations in Kentucky; (2) the steel channels used as crossbars act primarily as bearing plates for the bolts and not so much as beams to support the roof; (3) it is doubtful that it is practical if bolts over 8 ft. long must be used to reach into solid roof strata; (4) the suspended steel channels need not be as close together as post-supported crossbars; and (5) bolts must be driven in against the wedge by an air hammer instead of by hand, with an impact wrench used for tightening the nuts against the angle washer on the channel.

The last session, Saturday afternoon, was devoted to a symposium on education for coal mining in Kentucky. Prof. C. S. Carter, representing the University of Kentucky, opened the discussion, prefacing his remarks by the statement that there are ten offers of jobs for each graduate in mining engineering. The mining school is in urgent need of more money and better equipment, he said, and he urged coal operators to provide mining jobs for undergraduates during summer vacations. Ernest M. Stokes, graduate student and assistant instructor, reported that he has just started an extension class at a mining town in eastern Kentucky.

M. J. Ankeny, chief, Coal Mine Inspection Branch, U. S. Bureau of Mines, in his paper on the Bureau's accident prevention course for coal-mine officials, said that 22 industry-experienced mining engineers and coal-mine inspectors now are acting as teachers for the course, which was conceived in 1927 by J. J. Forbes and

tested in the field from 1930 to 1940. Seven Miners' Circulars, Nos. 27, 48, 49, 50, 58, 59 and 60, serve as text books. The course is 40 hours, minimum, and is usually divided into 20 two-hour periods. Since this instruction was resumed last year, more than 500 mine officials have completed the training and have been awarded certificates. Approximately 2,500 are enrolled at present and most of these are mine officials.

Instead of turning away would-be visitors by telling them an underground trip would be too dangerous, J. H. Mosgrove, safety director, Big Sandy-Elkhorn Coal Operators' Association, suggested the possibility that favorable publicity for attracting young men to the industry might be promoted by inviting influential groups, such as civic clubs, school principals and science teachers, to make tours of mines under the close supervision of mine officials. His paper, "What the Mining Institutes, Coal Operators' Associations and State Vocational Schools Are Doing to Promote Coal Mining Education," reported on the mining educational work accomplished and the further possibilities in that direction.

Harry Gandy, Jr., executive representative, National Coal Association, stated that the N.C.A. safety division was spreading safety education to the whole industry by: (1) making available without cost sets of the federal Bureau's Miners' Circulars; (2) furnishing pennants for flying each month as long as there is no compensable accident; (3) furnishing safety posters; and (4) supplying pay-envelope stuffers.

J. T. Parker, superintendent, Inland Steel Co., Wheelwright, Ky., assigned to the topic, "What We Would Like Our University to Do," offered the following suggestions: (1) re-establish the short or refresher course; (2) establish a two-year mining course and award certificates of competence for its completion; (3) establish extension courses as operated in other states; (4) establish cooperative course; and (5) have representatives of the University attend more mining meetings, keep in closer touch with high schools and seek advice from an operators' committee. He expressed surprise that only three men at the University are especially concerned with the teaching of coal mining. A major job of the industry is to convince the public that the disadvantages formerly associated with coal mining are being eliminated, he said.

•

Hudson Coal Co. Holds Eleventh Safety Banquet

Three supervisory officials of The Hudson Coal Co., Scranton, Pa., were honored late in November with presentation of gold keys and admission

to the Key Club at the 11th annual banquet of the group held at the Scranton Club. The men, who received the keys from Cadwallader Evans Jr., president, in recognition of their safety records, were: Ralph W. Smith, mine foreman, Pine Ridge colliery, James Donahue, section foreman, Pine Ridge; and Richard Bowen, section foreman at Loree colliery, since transferred to Delaware colliery.

Since establishment of the club in 1938, 104 officials of the company have been so honored with its membership. Crew foremen are admitted to the club on establishing a record of 12 months without a lost-time injury to any member of their crews.

Following talks by various members of the Hudson organization, the group heard an address by R. Emmet Doherty, dust engineer, Anthracite Institute, on "Our Mine Dust Control."

●

General Freight Rise Authorized by I.C.C.

A temporary increase of about 6 percent in all freight railroad rates was authorized Dec. 30 by the Interstate Commerce Commission, pending further hearings on the railroads' petitions. As a result of several actions before the commission last fall (*Coal Age*, November, 1948, p. 117), the railroads had asked for a general freight jump of 13 per cent and a boost of 40c. per net ton on coal, with an 8 percent general rise and 30c. jump on coal to be granted immediately on a temporary basis.

In authorizing the increase, the commission set a percentage figure for all commodities, including coal. Current rates are to be boosted as follows: within eastern and southern territories, and interterritorially between them, 6 percent; within Zone 1 of western trunk-line territory, 5 percent; within western territory, other than Zone 1 of western trunk-line territory, 4 percent; and interterritorially, other than between eastern and southern territories, 5 percent.

The action was the fifth freight-rate rise granted the railroads since June 30, 1946, it was reported, and brings the scale to approximately 52 percent over the level of that date.

●

Maryland Stripping Law To Be Tested in Court

A legal test of the existing Maryland stripping law is underway in a suit filed in circuit court by a land company and a stripping company. At a recent hearing, the plaintiffs reportedly claimed that the law deprives the land owner of free use of his property, that it is unfair and arbitrary since it applies only to coal and clay mining, excluding other open-pit operations, and that it applies exclusively to one county.

Hanna Coal Installs 45-Yd. Dipper

PREVIOUS DIPPER CAPACITY has been increased 5 cu. yd. with installation of this 45-yd. dipper on a Marion 5561 shovel in operation at the Georgetown mine of The Hanna Coal Co., St. Clairsville, Ohio. The new dipper, which began operation Dec. 1, represents a joint experiment on the part of Hanna and the Marion Power Shovel Co. to probe the "economic ultimate" of modified armor-plate steel in power-shovel dipper design and construction. Final conclusions on its success are not expected until it has been thoroughly tested, probably in seven to nine months.

In discussing the several factors that must be tested, Adrien F. Busick Jr., Marion chief engineer, pointed out that the new 45-yd. unit, fully loaded, weighs no more than the 35-yd. dippers, fully loaded, which were the world's largest up to three years ago. Because of the high percentage of rock in the overburden at the Hanna property, the dipper should be more than strong enough to hold its own wherever big stripping shovels currently are in use if it proves itself at Hanna, he said. A third factor to be considered is whether it will operate continuously night and day with a minimum of maintenance and repair.

The new unit was made possible, according to Marion, through a complete redesign that stripped every possible pound of excess weight from the dipper and its handle. One substantial improvement was accomplished by substituting armor-plate steel for cast manganese in the dipper lip, it was said. The new dipper is almost 100-percent armor-plate steel. Among a number of changes made to permit easier and more rapid filling is the more pronounced curve of the dipper teeth, which should enable the dipper to enter the bank and fill itself more readily, the company reported. Marion officials also pointed out that the ever-increasing size of shovel dippers may be near the ultimate until and unless new materials are developed that have weight-strength ratios not now obtainable.

In the photograph of the dipper before it left the Marion plant (above) are the following Marion officials: A. F. Busick Jr. (left), chief engineer; D. E. Rizor, assistant to the vice president in charge of sales and service; Charles Gerber, manufacturing manager; John M. Demarest, vice president and works manager; John P. Courtright, vice president in charge of sales and service; and Robert Pennisten, dipper-design engineer.

•

Coal Producers' Group Reports on Smoke Control

A more widespread but more intelligent demand for smoke abatement in the industrial cities throughout the country was reported by H. B. Lammers, chairman, Coal Producers' Committee for Smoke Abatement, at the group's annual meeting last month.

"When the Committee was organized eight years ago, the cry for smoke abatement assumed the form of hysteria and results were demanded overnight," Mr. Lammers said. "Of course this was impossible of achievement but very few persons wanted to believe that eight years ago. Time, however, has finally made it clear that if our cities are to be made free of smoke, it must be accomplished plant by plant, and through a spirit of cooperation rather than by use of the 'Big Stick'."

Distributed at the meeting was a booklet entitled, "The Coal Producers Attack Smoke," recently prepared to explain the purpose, program and results of the organization.

At the meeting, R. L. Ireland, Jr.,

"Give us the tools . . ."

McGraw-Hill Surveys BUSINESS NEEDS

If it can get the money American industry in 1949 will go full steam ahead with a vitally-needed program of improving its facilities. This program since V-J Day has kept business expanding and has made belated headway in modernizing industry.

Furthermore, if it can get the money American industry will carry on for the next five years with its unprecedented program of expenditure for new plant and equipment. Plans already made call for spending about $55 billion.

These are findings of the McGraw-Hill national survey of "Business' Needs for New Plants and Equipment." Major results of the survey, which have been rechecked since election day, are summarized on the following page. They report what American industry is now planning to spend for new plant and equipment. *They do not and cannot show what will be done if the plans are hamstrung by political action.*

In 1949, the survey shows, American industry plans to spend $14.1 billion for new plants and equipment. That is only about 5% less than was actually spent in 1948.

If these plans are carried out, actual capital expenditures this year may be somewhat larger than they were in 1948. That is because expenditures usually prove to be larger than planned.

Fulfillment of American industry's plans for investment in new plant and equipment this year would no doubt mean a continuation of general prosperity. The record shows that when capital expenditures are high general business thrives.

Even more remarkable than the 1949 prospect is the fact that:

Industry already plans to spend $41 billion in the years 1950-53 to improve its plants and equipment.

Plans tend to taper off, of course, as they are pushed further into the uncertain future, five years from now. But the striking fact is that plans for expenditures so far ahead are as great as they are. They show American industry's need for tremendous improvements in its plants and equipment.

Again, let there be no mistake. These survey findings are not a five-year forecast. They report what leading corporations now are planning to do – *if they can get the money.*

But – won't industry be top-heavy with plants and equipment if it carries through any such program?

The answer is clearly – "No".

Here are some of the reasons why not that were disclosed by the McGraw-Hill survey:

First, manufacturing industries are shifting emphasis from expansion to improving efficiency.

They have increased their total capacity 56% since 1939. Their expenditures in 1948 went almost 50-50 for expansion and improvement. But in the next five years they plan to spend three-quarters of their funds to replace and modernize facilities, only one-quarter for expansion.

Second, the prospective rate of expenditure for new plant and equipment is relatively low.

Planned expenditures for new plant and equipment in 1949 represent about 7.5% of the present value of all plant and equipment. That rate of capital expenditure is no higher than the rate during previous periods of prosperity. And industry must overcome years of starvation for new equipment, caused first by the depression of the 30's, then by diversion to war production.

Third, industry is following an extremely cautious policy in buying new equipment.

Three out of four companies report that they will not buy equipment unless it will pay for itself within five years. And a third of the companies report that they expect new equipment to pay for itself within three years. The reason most frequently given for such expectations was that all the money available can be spent on equipment which does pay for itself quickly.

The program of capital expenditure planned by American industry is one of the greatest bargains ever offered to the American people.

To pay for itself in a few years, as equipment must if most companies are to consider buying it, that equipment

continued on next page

WHAT THE SURVEY SHOWS

● HERE ARE THE MAJOR FINDINGS of McGraw-Hill's survey of "Business' Needs for New Plants and Equipment". Rechecked since Election Day, results show what industry is now *planning* to spend for new plants and equipment. They do not forecast what will actually be spent. The survey shows:

1. Industry now plans to spend $14.1 billion in 1949 – and almost $41 billion in the four years beyond, 1950-53.
2. Manufacturing industries alone plan to spend $7.2 billion in 1949. This is 7.5% of the estimated value – $96 billion – of all manufacturing facilities.
3. Manufacturers estimate conservatively that it would cost $136 billion to completely replace their facilities with the most modern plants and equipment available.
4. Postwar expansion is virtually complete in most manufacturing lines. Major exceptions: steel and petroleum refining.
5. Expansion programs of railroads, utilities, and oil companies still have two to five years to run.
6. Manufacturing industries have increased their capacity 56% since 1939. But expansion is slowing down. Increase planned in the next five years is only 13%.
7. Efficiency is emphasized more and more in planning new facilities. Manufacturers plan to devote almost three-quarters of their funds to replace and modernize. In 1948, 58% went to increase efficiency this way.
8. Equipment should pay for itself in five years or less, say three out of four manufacturing companies. New buildings, say 77% of them, should pay out in 15 years or less.
9. Profits and reserves are counted on to pay for new buildings and equipment by three out of four manufacturing companies. Some 15% expect to borrow, only 9% plan to sell stock. However, 20% would like to sell stock, only 4% want to borrow.
10. More liberal depreciation allowances for income tax purposes would prompt almost two-thirds of the companies to speed their purchase of new plants and equipment.

● A copy of a complete report on "Business' Needs for New Plants and Equipment" may be obtained by writing me at McGraw-Hill Publishing Co., 330 West 42nd St., New York 18, N. Y.

must promise to produce much better products or make great savings in labor and material. The savings go first to the companies buying the equipment but, as they always have, they soon spread to everyone in the form of better products at lower costs.

Where does industry expect to get the money to buy this bargain for the American people?

Most of the companies covered by the McGraw-Hill survey (76% of the total) count on their own resources – largely profits – to pay for new plant and equipment. About 15% of them expect to borrow money, although only 4% like the idea of getting saddled with fixed debt. Only 9% of the companies expect to sell stock to investors, although twice that many report they wish they could.

What are the chances that business can get the money?

The survey provides no answer to that question. No survey can.

The answer will come from Washington – in what Congress does about taxes on profits and taxes on the millions of Americans who might invest a part of their income in industry's new plants and equipment.

The answer will be found also in the energy and skill shown by investment bankers, particularly in mobilizing the resources of the millions of Americans whose incomes have increased enough since 1940 to make them potential direct investors in industry.

Still another important part of the answer will be given by labor leaders. About half the companies surveyed by McGraw-Hill are holding back on new construction – primarily because of high costs. What organized labor does about wages and productivity can swell or shrink that percentage.

The McGraw-Hill survey leaves no doubt that American industry is fulfilling its responsibility. It is planning the capital improvements needed to make the nation secure, prosperous, and progressive.

But business today lacks confidence and badly needs added incentives. Proper taxation and increased depreciation allowances are vital if we are to open the capital markets to finance industry.

What will happen now depends in large part on what is done in Washington. In his State of the Union message, the President said that "business should plan for steady, vigorous expansion." But in his budget message he proposed new taxes which would divert a substantial share of the money industry is using for expansion and improvement. Moreover, he said nothing about the vital issues now freezing the capital markets.

It is not possible to have it both ways. Fulfillment of the President's tax program means cutting industry's program for new and better equipment. It means slowing down industrial progress. It means delaying the advance toward much higher standards of living tomorrow in order to have a little more government spending today.

I urge you to see that your Representative and your Senator have all the facts on industry's needs for new plant and equipment. What they do to this program will have a decisive bearing on the nation's security and welfare.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

This is the fourth editorial of a special series on industry's needs for new plants and equipment – and what these needs mean to all Americans.

Wide World

Inaugural Float Features Kentucky Coal Industry

COAL SHARED THE SPOTLIGHT at the inaugural parade last month with this float from Vice President Barkley's home state. Lettered on the side of the tipple was the slogan, "Safety the First Consideration." A fully equipped miner added interest to the display.

Coal and Business Activity

		1949 to This Date	1949 Over 1948, to Date
Est. anthracite prod., week ending Jan. 15	1,050	2,082	—19.1%
Est. bituminous prod., week ending Jan. 15	11,880	23,540	—25.1%

Source: U. S. Bureau of Mines.

	Bituminous Coal Stocks (Thousands, net tons)				Consumption (Thousands, net tons)		
	Dec. 1, 1948	Day's Supply	Nov. 1, 1948	Dec. 1, 1947	Nov., 1948	Oct., 1948	Nov., 1947
Electric power utilities	24,894	90	23,815	16,673	8,261	8,689	7,737
Byproduct coke ovens	11,465	42	11,348	8,207	8,268	8,500	8,091
Beehive coke ovens	-	-	-	-	950	974	857
Steel and rolling mills	1,019	39	1,066	985	793	766	867
Cement mills	1,377	54	1,354	1,087	771	751	730
Other industrials	18,592	51	19,030	15,147	10,972	11,044	12,704
Railroads (Class I)	9,153	36	9,099	6,156	7,655	7,851	9,167
Retail dealers	3,079	15	2,924	2,200	6,210‡	7,375‡	8,010‡
Total	69,579	48	68,696	50,455	43,880	45,950	48,163

Source: U. S. Bureau of Mines. ‡Not available. †Retail dealer deliveries.

	Latest Week*	Month Ago	Year Ago
Business Week Index of Business Activity, wk. ending Jan. 15	198.0	199.6	196.1
Steel ingot operations (% of capacity)	100.1	88.6	96.1
Electric power output (million kw.-hr.)	5,727	5,790	5,370
Crude oil production (daily avg., 1,000 bbl.)	5,428	5,645	5,326
Misc. and L.C.L. carloadings (daily avg., 1,000 cars)	73	80	81
All other carloadings (daily avg., 1,000 cars)	48	51	57
Prices, spot commodity index (Moody's, Dec., 31, 1931 = 100)	390.6	393.7	452.0
Prices, industrial raw materials (B.L.S., Aug., 1939 = 100)	279.3	278.1	285.3
Prices, domestic farm products (B.L.S., Aug., 1939 = 100)	307.4	311.8	422.4
Prices, finished steel composite, (*Steel*, ton)	$97.77	$93.50	$78.18
90 stocks, price index (Standard & Poor's Corp.)	121.9	120.5	117.2

*Date of latest week for each series on request

president, Hanna Coal Co., and vice chairman of the Coal Producers' Committee, outlined the progress of the N.C.A. air purification committee, of which he is chairman. Ralph Mulligan, B.C.I. director, explained how the program would be developed through the various publicity channels of B.C.I. and Coal Heating Service. Ezra Van Horn, executive secretary, Ohio Coal Association, and 1948 chairman of the Coal Producers' rotating executive committee, reported on its activities during the year.

Other members of the executive committee of the smoke abatement group who served during the past year were: George Esser, Virginia Coal Operators' Association; L. C. Goering, L. & N.R.R.; T. J. Hoffman, West Kentucky Coal Co., Inc.; H. S. Homan, Big Sandy-Elkhorn Coal Operators' Association; W. L. Lloyd, Pennsylvania R.R.; A. A. Raymond, New York Central System; G. S. Ward, Harlan County Coal Operators' Association; and Garner Williams, Kanawha Coal Operators' Association.

Nachod Correct

Through error, installation of the electric switchthrowers and block signals at the Gorgas mine of the Alabama Power Co. (*Coal Age*, September, 1948) was incorrectly credited. The underground signals were purchased from the Nachod & U. S. Signal Co. and the electric track switches and controls from the Cheatham Electric Switching Device Co., both of Louisville, Ky.

•

U.M.W.A. Health Program Set to Start Functioning

The health and hospitalization project of the U.M.W.A. Welfare and Retirement Fund is now in operating order, it was reported Jan. 9 by John L. Lewis, union president and chairman of the board of trustees of the fund.

Since announcement that the health and hospitalization service was being inaugurated was made by Mr. Lewis at the U.M.W.A. convention last October, plans have been carried forward and are now virtually completed for the establishment and staffing of 10 area offices, which will service the 24 districts of the union in bituminous coal fields, it is reported.

Administration of the medical and hospital work of the U.M.W.A. Welfare and Retirement Fund is directed by Dr. Warren F. Draper, former deputy surgeon general of the U.S. Public Health Service. The area offices under his direction are located as follows: Beckley, Charleston and Morgantown, W. Va.; Johnstown and Pittsburgh, Pa.; Birmingham, Ala.; Denver, Colo.; Knoxville, Tenn.; Louisville, Ky.; and St. Louis, Mo.

By this new program, it is the purpose of the Welfare and Retirement Fund "to provide a prepaid form of hospital service and medical attention in all the districts and all the local unions," Dr. Draper said. Arrangements are being made to utilize existing local medical and hospital services "under conditions which guarantee high standards of medical and hospital care and are satisfactory to the physicians, the hospitals and the fund alike," it was stated. As arrangements are completed, the expense of medical and hospital services will be borne entirely by the U.M.W.A. Welfare and Retirement Fund. This will relieve U.M.W.A. members from having monthly amounts deducted from their wages for medical and hospital care.

"It is possible," Dr. Draper added, "that experience may demonstrate the necessity of providing additional and more specialized facilities for meeting the needs. But this will come from knowledge gained through present procedure and through the availability of funds."

For the present, activities will be directed to the hospitalization of miners who are already receiving dis-

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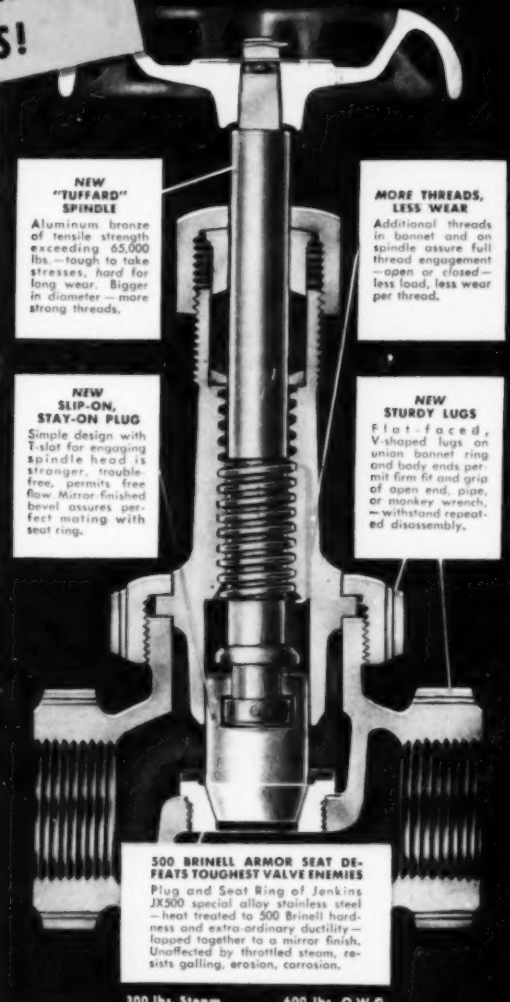

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ability benefits and pensions. Also among the first to be cared for will be members with serious conditions for which adequate treatment facilities are not available in the communities in which they live. This preliminary work will help area medical administrators establish proper procedures and train their personnel before assuming a larger work load, it was said.

●

Full Miner Training at First Harlan County Mine

All employees of Clover Splint mine, Consolidation Coal Co. (Ky.), Closplint, Ky., have successfully completed a first-aid training program, making it the first mine in Harlan County to be presented by the U. S. Bureau of Mines with a 100 percent first-aid training certificate, it has been reported. The program was accomplished with the splendid cooperation of Local No. 6331, U.M.W.A., and the mine management, and was sponsored by the safety department, U. S. Bureau of Mines, Norton, Va., according to Consol officials.

Eleven men selected by the local union were given instructor courses and in turn trained the entire mine organization, totaling 445 employees, in the 15-hour course. Both day and night courses were conducted to accommodate men working on the various shifts. Classes were held over a 40-mile area for the convenience of those living out of town.

●

Foreign Developments

McGRAW-HILL *World News*

GREAT BRITAIN—Estimated British coal production for 1948 was reported early in January as 208,418,500 tons. While the total was 3,310,800 tons under the government's target for the year, it was 5.93 percent over 1947 output, which in turn was 4 percent over 1946, the last year before nationalization. The preliminary estimates indicated that the open-cast goal of 11,000,000 tons in 1948 had been exceeded by 729,000 tons.

There is considerable question whether the industry can reach the 1949 goal of 211,000,000 tons. While it came close to meeting its goal in 1948, the prospect for 1949 is dim because during the latter part of the year the production rate was lower than for the entire year and was expected to carry over into 1949. In

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the last six months of 1948, the increase in tonnage over 1947 was only 2½ percent.

Absenteeism continued as one of the industry's major problems. The rate in 1948 was higher than in 1947 and about twice that before the war, and reportedly rose in the latter part of the year. During 1948, voluntary absenteeism averaged 7½ percent. With involuntary absenteeism, the rate was more than 10½ percent and about 14 percent at the face. Financially, the nationalized industry reportedly will break about even for the year.

MOSCOW—The Soviet Coal Ministry late in December estimated that coal production in 1948 would total 13.3 percent over 1947. No actual production figures were given for either year. The fourth five-year plan adopted in 1946 calls for a yearly output of 250,000,000 tons by 1950.

CANADA—Canadian coal production rose sharply in 1948, to reach the highest annual total in the last six years, according to preliminary estimates released by the government last month. Output for the year was 18,377,000 tons, 15.8 percent over the 1947 total of 15,869,000 tons. The previous high was 18,865,000 tons in 1942.

Most of the increase resulted from the greater tonnages produced in Nova Scotia and New Brunswick, it was pointed out. Nova Scotia in 1948 produced 6,430,000 tons, as compared with 4,118,000 tons in 1947. New Brunswick production rose from 345,000 tons in 1947 to 514,000 in 1948. In 1948, Alberta produced 8,074,000 tons; British Columbia and the Yukon, 1,772,000 tons; and Saskatchewan, 1,586,000 tons.

Imports during the year were estimated at 31,049,632 tons, an increase of 1.5 percent over the 1947 figure of 30,376,718 tons.

JOHANNESBURG, SOUTH AFRICA—Although overseas markets for coal are good, South African producers are not able to take the fullest advantage of them because of the serious shortage of railway cars. Besides being unable to fulfill existing contracts, the collieries are unable to accept new lucrative contracts.

In the 10 months, January-October, 1947, South African coal sales totaled 21,581,295 tons. The full year's total was expected to be about 26,000,000 tons, an increase over last year's 25,414,800 tons and 25,634,400 tons in 1946.

AUSTRALIA—A bill has been introduced in the state legislature of New South Wales to enable the government to develop new coal mines. The only large mine at present controlled by the state is at Lithgow, where production runs about 300,000 tons a year. It is planned to step this up to 500,000 tons immediately and to 650,000 tons later.

The act will enable the government

to develop two new coal mines at Awaba, for a combined annual production of 1,000,000 tons. Most of the coal will go to the projected power station at Lake Macquarie.

Also, in the Burragorang district, a very extensive deposit has been reserved for state operation. It is estimated that this area contains not less than 427,000,000 tons of coal, with diamond drilling revealing an 8 ft. 3-in. seam at 690 to 700 ft. The coal rates 13,461 B.t.u. Two inclined shafts more than 2,000 ft. long are planned and the mine is to be developed to produce 500,000 tons a year, with an ultimate capacity of 1,000,000 tons.

The bill also empowers the government to give financial assistance to mine employes in the acquisition of homesteads.

In 1948, New South Wales mines produced 11,716,000 tons of coal, 37,000 tons more than in 1947, but 370,200 tons less than in 1942, the peak year. The total also is 1,284,000 tons short of the Joint Coal Board target of 14,000,000 tons. Open-cut production increased 293,000 tons over 1947, while underground production dropped by 260,000 tons.

●

Increased Coal Use Seen for California

California probably will have to turn to coal as a fuel source for power generation within the next 20 years, Robert P. O'Brien, supervising engineer for the state Public Utilities Commission, recently declared. Estimating that electrical energy produced by fuel will have almost doubled by 1970, he said that "it seems certain that sources of fuel for electric production other than oil and gas will have to be found before many of the next 20 years have elapsed.

"Probably the most promising immediate source of relief will be coal supplies in Utah," he said. He recommended that action be taken to develop the mechanics of this fuel source within the next few years.

Hydro capacity in the state, which is now about 61 percent of the total, will shrink to about 48 percent by 1970, he predicted. He forecast a power load of 12,900,000 kw. by 1970, based on an estimated population of 16,000,000.

●

Obituaries

L. Rodman Page, who retired a few weeks ago as president, Page Coal & Coke Co., Philadelphia, died Jan. 9 at his home in Villanova, Pa.

B. W. Whitfield Sr., 84, pioneer Harlan County coal operator, died Jan. 4 at Harlan Ky., of a heart ailment. Mr. Whitfield, known as "Uncle Bryan" to many in the county, was president of Harlan Collieries Co. and Bell Coal Co., Brookside, Ky., at the

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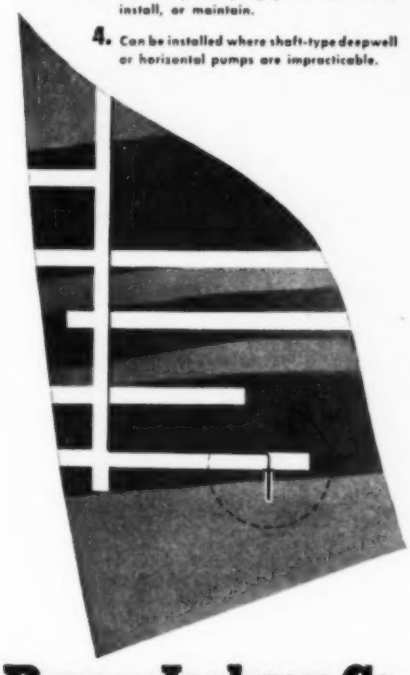

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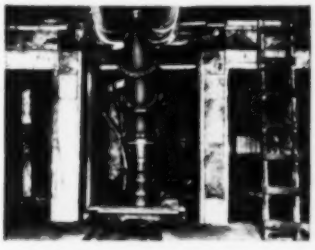

THE COMPLETE PUMPING UNIT can be hung in the shaft, submerged in a collection sump, or placed at the best water pick-up point. Discharge can be to surface, to other mine levels, or to abandoned workings. The Submersible replaces other more complicated horizontal and standby booster pump stations. A single pump can lift up to 1500 feet or handle capacities up to 3000 gpm. Greater lifts and capacities can be provided by combining two or more Submersibles in the same mine shaft or on a single discharge line. Write us today for further details.

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time of his death. He came to Kentucky from Alabama in 1907 and organized the Left Fork Coal Co. in Bell County. In 1911, he and his brother, the late A. W. Whitfield Sr., organized the Clover Fork Coal Co. in Harlan County and reportedly shipped the first coal from that county the following year. He was one of the founders and a charter member of the Harlan County Coal Operators Association and also was a vice president of the group at one time.

Raymond Simmons, 41, assistant foreman for the Logan County Coal Corp., Logan, W. Va., was killed Dec. 28 in a haulage accident at the mine.

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Personal Notes

H. Eugene Mauck, formerly superintendent, Westland mine, Pittsburgh Coal Co., Washington, Pa., has been named assistant to Leigh Willard, president, Olga Coal Co., with headquarters in Cleveland. Following graduation from Penn State College with a B.S. in Mining Engineering, Mr. Mauck joined a training program of the Pittsburgh Coal Co., and served as a mine superintendent for that company for almost six years. Before college, he was actively engaged with his father, A. B. Mauck, in operating mines in Illinois.

R. A. Hedland, general superintendent, Utilities Elkhorn Coal Co., Pikeville, Ky., has been named general manager of the company, succeeding J. E. Bowman, elected president of the company last spring. To succeed Mr. Hedland, **J. E. Green** has been advanced from assistant to general superintendent. Mr. Hedland came to Utilities Elkhorn from the Hutchinson Coal Co., Logan, W. Va., in 1941, and before that was associated with the anthracite division of the M. A. Hanna Co. for several years. Mr. Green joined the company in 1930 as an office clerk, having previously been associated with the Elkhorn Coal Corp.

F. Earle Snarr, superintendent, Orient No. 1 mine, Chicago, Wilmington & Franklin Coal Co., Orient, Ill., has been appointed assistant to General Superintendent John Rodenbush. Mr. Snarr has been succeeded as superintendent of the Orient mine by **Howard Schultz**, his assistant for several years.

Johnstown Coal & Coke Co., Johnstown, Pa., has named **John Howe** superintendent of its Portage, Pa., operations, and **Ted Orr** superintendent of its Beaverdale, Pa., operations.

Karl E. Gustafson has been appointed assistant chief mining engineer of the Dominion Steel & Coal Corp., Ltd., Montreal, Canada.

A. W. Hawley, secretary, Preston County Coke Co., Cascade, W. Va.,

has been elected president, succeeding H. C. Greer, head of the company since its formation in 1907, who died several months ago.

Fred C. Babcock has been elected president, Babcock Coal & Coke Co., Pittsburgh, Pa., succeeding his father, the late E. V. Babcock. **John K. Saxman Jr.** has been elected vice president and treasurer, and **Robert P. Babcock**, secretary.

Albert Hood has been appointed production engineer, Warwick mine, Duquesne Light Co., Greensboro, Pa.

Leicester Busch Faust, secretary-treasurer, Saint Louis & O'Fallon Coal Co., St. Louis, Mo., since 1936, has been elected chairman of the board of directors, to succeed **Adalbert vonGontard**, who resigned to devote his time to his duties as vice president of Anheuser-Busch, Inc. **O. L. Livesay**, treasurer of Anheuser-Busch, has been elected to succeed Mr. Faust as secretary-treasurer of the coal company. **Percy J. Orthwein** and **Dwight D. Ingamells** also have resigned as directors. Newly elected to the board of directors were: **John Flanigan**, son-in-law of August A. Busch Jr.; **Adolph Busch Orthwein**, grandson of August A. Busch Sr.; and **Paul V. vonGontard**, son of Adalbert vonGontard. In announcing these changes, W. F. Davis, president, pointed out that on Sept. 29, 1948, the Saint Louis & O'Fallon Coal Co. celebrated its 50th year in business. It was acquired by Adolphus Busch, founder of Anheuser-Busch, in 1913 and since that time has mined 22,184,617 tons of coal. The mine is highly mechanized. Mr. Davis reported, and has the best work record of any shaft mine in St. Clair County, Illinois, with a safety record of 2,443,096 tons mined to Dec. 31, 1948, since the last fatal accident on July 11, 1944. Close cooperation between the P.M.A. and the management has made this possible, Mr. Davis said.

D. D. Wilcox, general superintendent, Superior Coal Co., Gillespie, Ill., for more than 45 years, has retired because of ill health. **Lawrence Kiss**, superintendent, has been advanced to general superintendent, to succeed Mr. Wilcox. **Robert McKee**, assistant superintendent, has taken Mr. Kiss' place as superintendent, and in turn is succeeded by **Stewart Pratt**, mine manager, Mine No. 3. **John McDonald** has been appointed mine manager at No. 3.

James G. Muncie, inside foreman, Birdseye colliery, The Hudson Coal Co., Scranton, Pa., has been appointed inside foreman at the company's Eddy Creek shaft, succeeding Ralph L. Van Horn, deceased. **Joseph Nixon**, section foreman at Eddy Creek, has been promoted to inside foreman at Birdseye, in Mr. Muncie's place.

Alex J. Colquhoun, associated with the Peabody Coal Co. since 1912, has been promoted from assistant to

superintendent, Taylorville-Springfield district, Springfield, Ill., succeeding J. W. Starks, named director of the Illinois Department of Mines and Minerals. **Lynn Trovillion,** former assistant to Mr. Starks, has been appointed assistant superintendent of the district, in place of Mr. Colquhoun.

Emerson B. Priest has joined Bituminous Coal Research, Inc., with headquarters at its Columbus, Ohio, office, to work with manufacturers, distributors and service men in the marketing and installation of B.C.R.-developed smokeless residential heating equipment. Mr. Priest was formerly associated with Conlon-Moore Corp. and has had extensive experience in testing, producing and selling smokeless heaters with that company.

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Oil and Gas Controls Ended by President

The emergency conservation order covering oil and gas issued Jan. 17, 1948, was revoked by President Truman Jan. 15. In indicating the end of what has been considered a crisis in the fuel oil situation, he wrote in his revocation order: "This action is possible because of the gratifying improvement in the general fuel supply situation."

The president stated, however, that spot shortages still existed in some areas and cautioned federal agencies to be economical in their use of fuel oil.

Earlier on Jan. 4, Secretary of the Interior J. A. Krug reported that oil supplies were so greatly improved that he would not have to renew his economy appeal of last winter. He pointed out, however, that there had been no material improvement in the long-range situation.

"The United States may continue to be in a precarious position in oil if present efforts to find new sources of liquid fuels, including synthetics, are not vigorously prosecuted," he said. He asked the public to refrain from converting heating plans from coal to oil.

•

Natural-Gas Line Planned To Serve New York City

Construction of an 1,800-mile natural-gas pipeline from Texas to New York City for the Transcontinental Pipeline Corp. was scheduled to begin April 1. Cost of the project is estimated at $200,000,000. The contract for the work had been let to the Fish Engineering Corp., Houston, Tex.

Originating near McAllen, Tex., the 30-in. main line will have 400 miles of laterals. It will run through Louisiana, Mississippi, Alabama, Georgia, up the east coast to Philadelphia, then to Newark and New York. The first delivery point will be at Philadelphia.

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372	1¾ cu. yds.	4161	5 cu. yds.	**7200 Walker	5-7 cu. yds.
*93-M	2½-3 cu. yds.	151-M	6 cu. yds.	**7400 Walker	8-12 cu. yds.
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B.C.R. Explains Work In Regional Meetings

The fourth in a series of luncheon meetings being conducted to inform company executives of the organization, recent accomplishments and research plans of Bituminous Coal Research, Inc., was held in Pittsburgh Jan. 19 for coal-company officials in Western Pennsylvania.

Dr. C. J. Potter, president, Rochester & Pittsburgh Coal Co., and B.C.R. director and regional chairman for the district, presided at the meeting. J. B. Morrow, B.C.R. president, and vice president, Pittsburgh Consolidation Coal Co., outlined the group's business structure and policies. Dr. H. J. Rose, B.C.R. vice president and director of research, described its objectives and accomplishments in coal-utilization research. Dr. H. C. Howard, assistant director, coal research laboratory, Carnegie Institute of Technology, told of projects in fundamental research at Carnegie Tech, to which B.C.R. contributes.

Similar meetings will be held in other major coal centers to inform member and non-member companies of research progress and plans and secure their recommendations.

New Developments

• The Consolidated Coal Co., St. Louis, Mo., is reported to have purchased the Schoper mine near Carlinville, Ill., and is understood to be planning to reopen and develop the property as soon as machinery, steel and other equipment are available. Because of steel shortages, it is estimated that it may take from one to four years to put the shaft in operating condition. The mine was originally opened during the first world war, closing down afterwards. During the past 15 years it has had several owners and has had brief periods of operation. Purchase price for the property was reported at $150,000.

• Large-scale expansion plans for its Cokeburg, Pa., mine, by the Bethlehem Collieries Corp., have been reported. A new portal is to be opened, with a new plant located at the portal, from which all coal will be taken. Full-seam mining is being planned and a conveyor belt will transport the coal from the mine to the cleaning plant.

• The Sharon Steel Corp. was expected last month to reopen the Joanne mine at Rachel, W. Va., purchased last year from the Jamison Coal & Coke Co. Production is reportedly planned at 1,600 tons daily and approximately 125 men will be employed.

• The Ronald, Wash., mine, closed Dec. 3, has been reopened by a reorganized Roslyn-Cascade Coal Co., with Harry S. Patrick, of Yakima, assuming active management as pres-

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The Spir-L-Weld of Coalmaster augers provides a smoother, fast conveying flight surface with reduced resistance and less strain on the operator or equipment.

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Time lost in auger changes is a thing of the past with quick make-and-break Hexanspeed couplings. Auger changes are a matter of seconds. Note how this high strength, rigid coupling (at left) makes possible the tubular core that gives the advantage of light weight augers for underground drilling.

DRILLING COALMASTER TOOLS

CENTRAL MINE EQUIPMENT COMPANY

ST. LOUIS 15, MO.

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ident. The mine, the third largest in the state and employing 130 men, was originally closed because of high production costs, according to the late Charles F. Larrabee, former president. The new management is understood to be planning installation of new mining equipment. Joseph Heron has been named mine superintendent.

●Compass Coal Co., Philippi, W. Va., a subsidiary of the Clinchfield Coal Co., Dante, Va., last month opened its new Compass drift and strip mine at Barbour, W. Va. The operation will mine the Pittsburgh and Redstone seams and is planned for a capacity of 10,000 tons daily and a life expectancy of 30 years. Coal shipments will be made via the B. & O. over a five-track preparation plant being built that will include a Chance-cone cleaning system, shaker and vibrating screens. Sizes to be shipped include egg, stove, nut, stoker, pea and nut-slack. A. R. Matthews is president of Compass and W. G. Quillen Jr. is general manager.

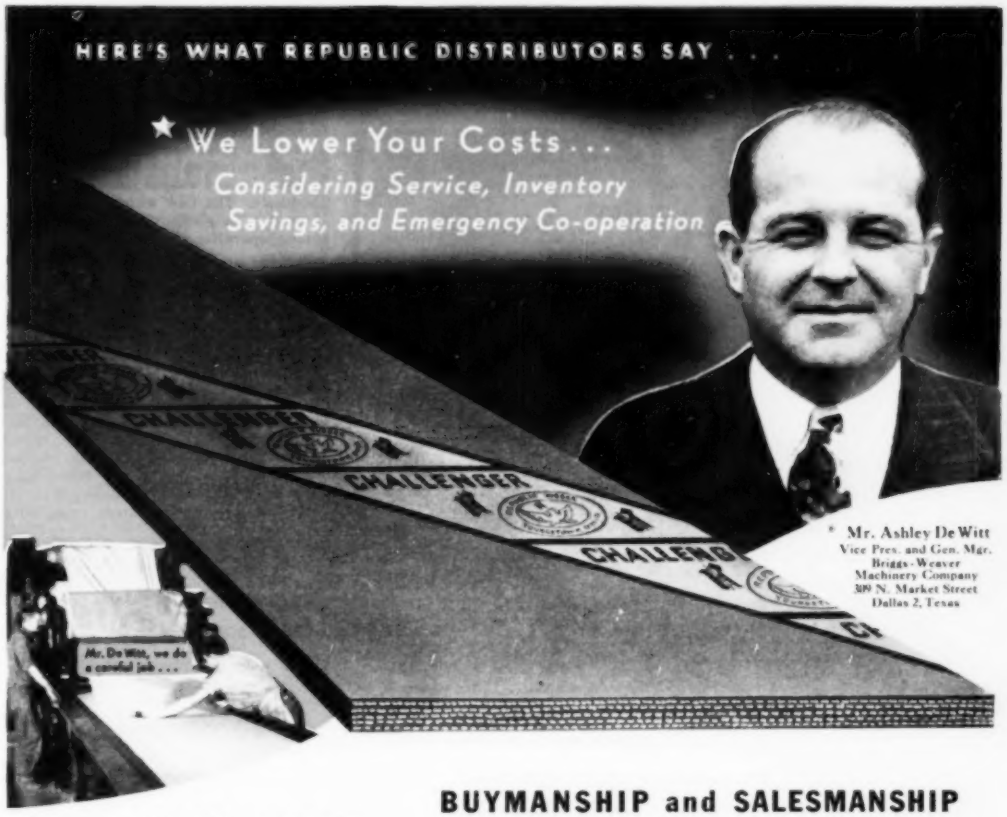
●Pittsburg & Midway Coal Mining Co., Pittsburg, Kan., is developing a new strip operation at Steamboat Springs, Colo. Production of the first coal from the mine is expected about June.

●McNabb Coal Co., Catoosa, Okla., was expected early last month to open its new White Oak mine near Venita, Okla. The operation is planned for a daily output of 2,000 tons, shipping over a five-track tipple via the Frisco R. R.

●A new strip mine with a capacity of 1,500 tons daily was opened late in 1948 by Spiro Coal & Mining Co., Spiro, Okla. Development of a deep mine on the property, with production scheduled in about 18 months, is being planned. The Hartshorne seam is being mined. Guy Johnson is president of the company and V. M. Stroud, superintendent.

●Test drilling in one of California's oldest coal mines has reportedly been begun by the Southport Land & Commercial Co., San Francisco. The company hopes to locate two coal seams in the Nortonville mine in Pittsburg, a major producer between 1872 and 1886. E. S. McCurdy, company president, expects to find the Black Diamond vein at about 1,400 ft. and the Clark at a depth of about 900 ft. The drilling, under the supervision of the U. S. Bureau of Mines, was expected to be completed in about 30 days.

●Final working-out and closing of Zeigler No. 1 mine, Zeigler, Ill., was announced early last month by the Bell & Zoller Coal & Mining Co., Chicago. The shaft, which is said to be the oldest in Franklin County, is reported to have produced more than 40,000,000 tons of coal. Bell & Zoller acquired the property in 1910. The company's new No. 3 mine near Zeigler will replace the No. 1 mine and absorb many of its miners.



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• The Rothwell mine at Minto, New Brunswick, Canada, reportedly has been sold to A. W. Wasson, Ltd. The 3,700-acre property has been operated under lease since 1926 by W. Benton Evans until recently, when he purchased the property and mining rights outright from the Rothwell Coal Co. While stripping has been done in the past, present output is mainly from a shaft. The new owners are understood to be planning to expand stripping operations, in addition to shaft mining.

• First shipment of a hard-type coal from its mine in Alberta, Canada, recently was reported by Alberta Hard Coals, Ltd. Although the coal now being tunnel-mined is not anthracite, according to P. M. Ramsey, the company's consulting engineer, it has a low moisture content and runs between 13,500 and 14,000 B.t.u. Consistent production is expected in the future, with approximately 10,000 tons shipped to the east by spring, Mervyn Brown, company president, reported.

•

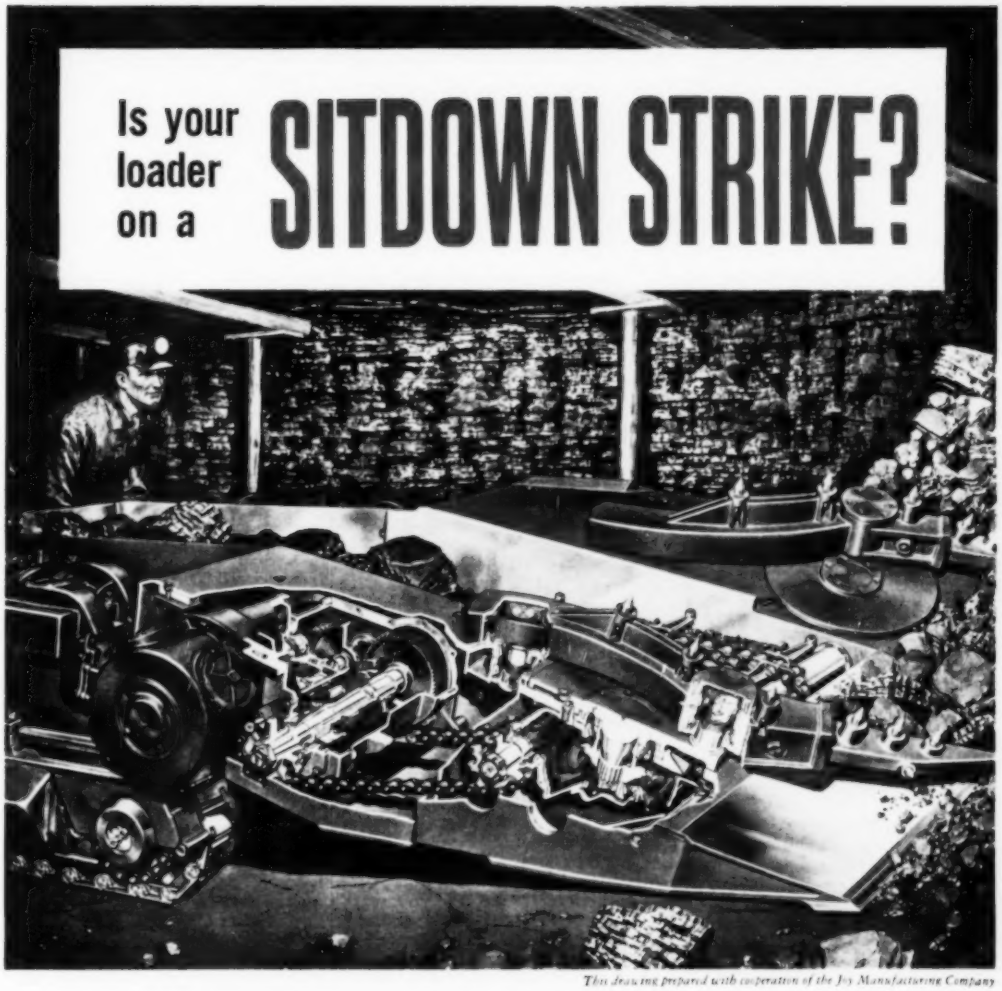
State Official Analyzes Anthracite Accidents

In a letter addressed to all anthracite mine inspectors, mine officials and miners, Joseph J. Walsh, Pennsylvania Deputy Secretary of Mines, Jan. 3 pointed out that only 20 of the 129 fatalities in the anthracite industry in 1948 were "chargeable to the hazards of the industry," a rate of 0.13 per million man-hours. While the industry's rate of 0.85 was the best yearly rate ever established, much more remains to be done, he said.

The other 109 fatalities, he reported, were chargeable to the lack of precaution, lack of experience, lack of sufficient care and the tendency of human nature to follow inclination rather than reason. One or more of these contributing elements on the part of officials, miners, victims or other workers were found by the mine inspectors. Considering the existence of all these imperfections, which contributed to 84 percent of the fatalities, Mr. Walsh said, "it should be obvious that more and better supervision of the working faces is vitally necessary."

No safety or first aid training, he pointed out, can take the place of practical supervision earnestly and sincerely applied. "A brief glance at the factors responsible for the fatalities accounted for in this statement should go a long way toward enabling us to see the need for more and better supervision. It has been estimated that the amount of time spent in supervising safety at a chamber face, by a mine foreman or his assistant during a shift, consists of about 10 minutes in one visit. All we are asking for in addition to this is another such visit," he wrote.

Is your loader on a SITDOWN STRIKE?



This drawing prepared with cooperation of the Joy Manufacturing Company

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If this is true, it's possible that faulty lubrication is to blame. Maybe a transmission gear or bearing has worn out under the constant shock loads.

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Association Activities

Montana Coal Operators' Association, at its annual meeting in Billings last month, reelected its officers as follows: president, S. H. Clarke, Roundup; vice president, W. A. Romek, Red Lodge; secretary-treasurer, D. F. Buckingham, Billings; and assistant secretary, Mrs. Kay Penman, Billings. Named members of the executive board were: Messrs. Clarke and Romek; G. E. Gildroy, Roundup; Thomas Morgan, Roundup; and J. R. Brophy, Red Lodge.

•

Red Jacket Foremen Set New Safety Records

Seventy-nine foremen of the Red Jacket Coal Corp., Columbus, Ohio, who bossed their crews without a lost-time accident in 1948, were honored with a steak dinner with full trimmings and were given appropriate certificates at an afternoon get-together at the Mountaineer Hotel, Williamson, W. Va., January 15. The 79 foremen add up to 40 percent of all foremen employed by the company and compare with 8 percent who won similar recognition in 1946 and 32 percent who were honored for 1947.

A. J. Alexander, chief, West Virginia Department of Mines, presented certificates to the 56 foremen with perfect records in 1948 and the 18 foremen who had perfect records for 1947 and 1948. W. M. Ritter, general manager of the company, awarded gold pins to the five foremen who had not had a man injured for three consecutive years. In addition, Cy Williams, assistant chief engineer, substituting for J. F. Maurice, chief engineer, gave white safety hats to the five 3-year men and to the 26 foremen who cleared their records after having one or more lost-time accidents in 1948. Paul D. Ritter, president, presented to A. F. Cook, superintendent, Junior mine, a trophy for setting the best safety record among the company's eight operations.

Mr. Alexander, in making his presentation, said that incomplete data for the state in 1948 indicated that the Red Jacket Coal Corp. had made the second best record and possibly the best. Mr. W. M. Ritter, commenting on the record of the 3-year men, pointed out that collectively they had supervised the production of 870,000 tons of coal without a lost-time accident.

Much of the improvement in the company's safety record was attributed to remarks made at a similar dinner two years ago, when Mr. P. D. Ritter, passing along a message from J. W. Dawson, chairman of the board, declared that not a pound of coal was wanted if it had to be stained with miners' blood.

With R. A. Ison, assistant general manager, as toastmaster, short talks

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were given at the dinner by four representatives of the U. S. Bureau of Mines—J. J. Forbes, chief, Health and Safety Branch; M. J. Ankeny, chief coal-mine inspector; W. H. Tomlinson, supervising engineer, Norton, Va.; and A. U. Miller, supervising engineer, Mt. Hope, W. Va. J. J. Plasky, training and safety director of the company, applauding the foremen for their achievement, credited the Bureau of Mines, state inspectors and mine safety committees for a large share of the improvement and called special attention to the fact that there were only two accidents from roof falls at the Mitchell Branch and Junior mines in 1948.

Top foremen in safety are as follows:

Three years without lost-time accident—Grover Bradford, T. D. Jordan, and E. M. Tolliver, Wyoming mine; and J. Carl Cook and Haywood Dean, Junior mine.

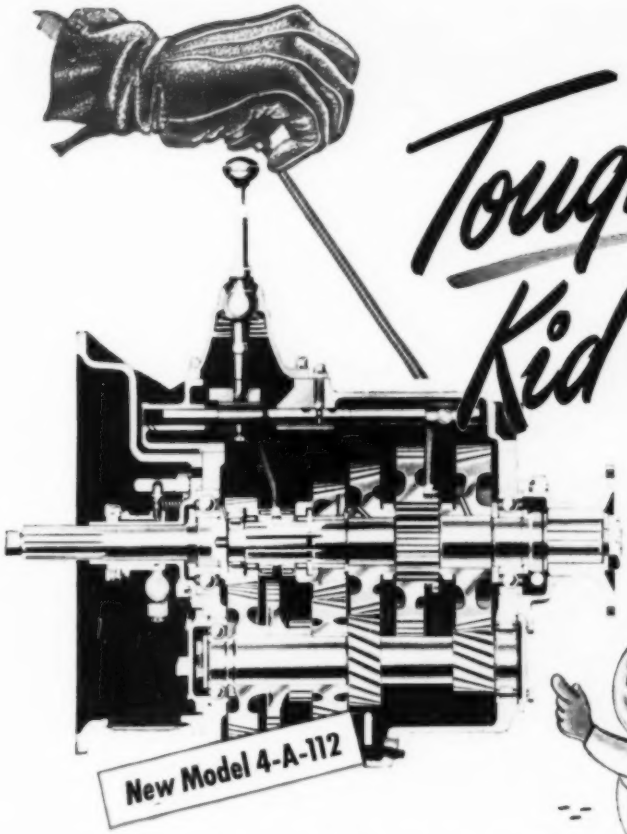
Two years without lost-time accident—Byron Ball, Lewis Hardesty, Clyde Hammond, Jones Kennedy and Lewis Simpkins, Junior mine; R. S. Dean, Norman Presley and Harry West, Keen Mountain mine; Mike Ferrell and Light Hatfield, Coal Mountain mine; Guy Barrett, C. W. Bellew, G. A. Neal, Roy Short and Hubert Thomas, Wyoming mine; G. E. Ritter and Charlie Turk, Mitchell Branch mine.

One year without lost-time accident—F. N. Bensey, Dominick Clusky, C. L. Eanes, Jerry Ison, Dennis Ison, Homer Mahone, Emory Osborne, Howard Radford, Rufus Sipple, Ralph Staten, E. K. Toler and Amon Workman, Mitchell Branch mine; William Carey, F. C. Daniels, Dayton Johnson, Ance Kennedy, Nathan Maynard, A. A. Mankin, W. B. McClure, Kenneth Rowe, Fred Sears and Wayne Simpkins, Junior mine; W. D. Brown, Mont Howell, Kenneth Smith and Sephas Wicker, No. 6 mine; Joe Browning, Clyde Morgan and Otti Trent, Coal Mountain No. 12 mine; Audley Barrett, Tommy Bailey, Dale Browning, Richard Collins, Denver Ellison, J. E. Hagaman, Fred Shannon, T. E. Sizemore, Charlie Smith, Frank Smith and Dan Winters, Wyoming mine; W. O. Bohon, Luther Dillon, Robert Hinkle, A. K. Hooker, Lester Mabe, Leonard Skeens, John Spradlin and Ed Steele, Keen Mountain mine; Ward Blankenship, Charles Cox, John Fowler and Gussie Morgan, Coal Mountain mine; Don Shields, Coal Mountain outside.

•

W. Va. Mines Closed In Fireboss Dispute

Four mines in Raleigh County, West Virginia, were closed by Jan. 13 in a walkout of an estimated 1,100 miners in protest against the practice of firebosses reporting by telephone. Arch J. Alexander, chief of the West Virigina Department of Mines, immediately requested a ruling on the



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"Truck-killer" hauls that call for sustained low-gear operation are made to order for the new Model 4-A-112 Fuller Transmission—a four-speed version of Fuller's extra-large, heavy-duty "1120" series. Model 4-A-112 is the outgrowth of Fuller's success with its five-speed Model 5-A-1120.

Helical gears in all forward ratios give Model 4-A-112 capacity to operate in low for long periods of time. The high capacity of helical gears results from the large tooth areas which are always in contact.

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legality of the practice from Ira J. Parlow, state attorney general.

In his opinion, Mr. Partlow said that it was legal for firebosses to report on safety conditions in mines by telephone. He questioned, however, the legality of using underground fireboss stations, by which miners can proceed part of the way into the mine while the rest is being inspected. He also questioned the legality of mine foremen or section bosses acting as firebosses. Mr. Alexander reported that letters of instruction had been sent to all operators, in accordance with the ruling.

By Jan. 25, it was reported that at least 13 mines in the state were closed, with indications that the walkout was spreading to the northern section of the state. Meanwhile, on Jan. 22 a group of about 60 coal operators reportedly petitioned the state supreme court for an interpretation of the department's ruling prohibiting mine and section foremen from acting as firebosses and asked for an order restraining the department in the meantime. The day previously a Kanawha circuit court judge had refused to act on a similar petition seeking to block the mines department's action.

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Court Halts Township's Strip-Equipment Tax

The attempt of the Hazle (Pa.) Township School District to force coal operators to pay a tax on strip-mining equipment recently was blocked when Luzerne County Judge Thomas M. Lewis directed that a mandatory injunction be issued enjoining the district from collecting the tax from the A. E. Dick Contracting Co., Hazleton, Pa., which has been fighting the regulation in court since its passage last summer. The resolution called for a tax of $1.50 per horsepower on all shovels, draglines, trucks and other such equipment.

In the ruling, the court declared the resolution illegal because it duplicates a tax levied by the Commonwealth of Pennslyvania and such duplication is prohibited in Section 1 of the Stonier-Brunner law under which the district was acting in levying the tax. The court pointed out that the stripping equipment to be taxed forms a part of the capital assets of the Dick corporation and as such is taxable under the Capital Stock Tax Act of 1899, as amended.

The judge also held the tax invalid because it violates Sec. 1 of Article 9 of the Pennsylvania Constitution, in that the tax is not uniform and is imposed without regard for the value of the property. As an example on this point, he pointed out that the tax was based on the horsepower of the equipment as determined by the manufacturer's specifications, with no consideration of its depreciated value.

Coal Said Able to Meet All Needs for 1,000 Years

The vast coal resources of the United States should meet all requirements for heat, light, power and transportation for more than a 1,000 years at the present rate of fuel consumption, Dr. Edward R. Weidlein, director of the Mellon Institute of Industrial Research, Pittsburgh, declared Jan. 20 in an address to the Philadelphia section of the American Chemical Society. Dr. Weidlein is a former president of the society and the 1948 winner of its Priestly Medal, the highest honor in American chemistry.

Half the world's known reserves of coal is possessed by the United States, according to Dr. Weidlein, who said many industrial leaders and technical experts believe "that a large industrial development based on coal is in the making, and that a considerable expansion in coal production is imminent." Up to now, he reported, the nation's abundant petroleum supplies have discouraged the study of coal, with the result that far too little fundamental research has been done on it.

Now, however, the petroleum supply picture has changed so radically that national security itself depends on the development of new sources of liquid fuel, Dr. Weidlein asserted. "No well-informed responsible technical man, whether in petroleum, geological, chemical or government circles, believes that our country can long continue to meet the increasing demand for liquid fuel from U. S. petroleum, or even from Western Hemisphere sources," he warned. "If there is another war, the liquid fuel problem will be immediate and acute." Present peacetime consumption of petroleum products is greater than at the height of World War II, he pointed out.

Earlier on Jan. 11, R. J. S. Pigott, chief engineer, Gulf Research and Development Co., Pittsburgh, in paper read before the annual meeting of the Society of Automotive Engineers in Detroit, said that development of additional sources of power and greater efficiency of fuel consumption will supplement petroleum reserves within 20 years to assure adequacy of supply. He recommended that adequate supplies of automotive fuels be assured by transferring all possible energy use to solid fuels, reserving liquid and gaseous products for operations that could not do without them.

Second N.L.R.B. Decree Hits U.M.W.A. District

In its second decree of the month directed at District No. 31, U.M.W.A., the National Labor Relations Board Dec. 23 ordered the district to cease restraining and coercing employees of four West Virginia coal companies. Like the earlier order (*Coal Age*, January, p. 116), the decree was based on stipulation by the district that it

would refrain from such activities.

The complaint, which had been issued by the N.L.R.B. general counsel, had accused the union of forcing shutdown of the four mines in an effort to compel their workers to join the union during the pension strike last spring. At two of the operations, it was said, employees were prevented from leaving until membership applications were signed. The order issued does not restrict the union from soliciting membership or other union activity.

The companies involved in the case were: Ruthbell Coal Co., Hartman Coal Co., George Kefover Coal Co., all of Kingwood, W. Va.; and the Borgman Coal Co., Borgman, W. Va.

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Preparation Facilities

Sunday Creek Coal Co., Corning, Ohio—Contract closed with K. Prins & Associates for five-track tipple and preparation plant to handle 300 t.p.h., run-of-mine, and to include two Prins washers to clean 5x1¼ and 1¼x0, with crushing facilities to reduce plus 2-in. lump; plant to be arranged for mixing and loading five sizes; coal brought to surface by slope belt from new underground mine to be transferred to run-of-mine belt for conveying to tipple and washery; coal in transit can be unloaded from railroad cars at transfer station, with coal from nearby strippings unloaded at this point for processing in plant.

Fayette-Jellico Coal Co., Warren, Ky.—Contract closed with K. Prins & Associates for additional plant facilities to wash 100 t.p.h., 3x0-in. coal, including standard 100-t.p.h. Prins washer and a Robins horizontal double-deck vibrating dewaterizing screen to separate washed product into 1½x3-in. and 1½x28-mesh coal.

Jonathan Coal Mining Co., Dalton plant, Paximos, Pa.—Contract closed with Deister Concentrator Co. for Concenco revolving feed distributor arranged for three-way distribution to SuperDuty No. 7 coal-washing tables.

Jonathan Coal Mining Co., Swatara plant, Pine Grove, Pa.—Contract closed with Deister Concentrator Co. for SuperDuty Diagonal-Deck coal-washing table to clean No. 4 buckwheat.

Semet-Solvay Division, Longacre, W. Va.—Contract closed with Deister Concentrator Co. for 20 SuperDuty Diagonal-Deck No. 7 coal-washing tables to clean ⅜x0-in. coal. Two concenco revolving feed distributors, arranged for 10-way distribution, will distribute feed to the 20 tables.

Eastern Gas & Fuel Associates, Kopperston mine, Kopperston, W. Va.—Contract closed with McNally-Pittsburg Mfg. Co. for new washer addition to expand present preparation capacity from 800 to 1,075 t.p.h.; new

facilities to include two new McNally-Menzies cone cleaners, permitting 5x1¼-in. to be washed in one present and one new McNally-Menzies cones and the 1¼x⅜ to be cleaned in a second present and second additional units; washed coal from both coarse- and fine-coal cones to be classified at 5x1¼ and 1¼x⅜, with ⅜x0 dewatered in fine-coal dewatering elevator.

Eastern Gas & Fuel Associates, Wharton Mine No. 2, Barrett, W. Va. — Contract closed with McNally-Pittsburg Mfg. Co. for new preparation and cleaning facilities, with run-of-mine to be fed to plant via McNally-Pittsburg rotary dumper and trip feeder at rate of 250 t.p.h.; feed controlled by two Jeffrey-Traylor vibrating feeders, with run-of-mine to be screened at plus-5-in. and 5x0; hand-picked plus-5-in. crushed to 5-in.-minus in McNally-Pittsburg breaker; hand-picked rejects crushed in McLanahan & Stone rock crusher; 250 t.p.h. of 5x0-in. raw coal to be washed in one McNally-Norton automatic washer; washed coal classified and dewatered at ⅜-in.; ⅜x0 to be centrifugally dried in McNally-Carpenter centrifugal dryer and, as final preparation, to be thermally dried in one Raymond flash dryer prior to blending with 5x⅜ washed coal for final loading; original design provides for future expansion to 500 t.p.h. of washed coal, classifying raw coal at 5x1¼ and 1¼x0, with thermal drying of ⅜x0-in. coal as previously stated.

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Coal Publications

Some Outstanding Safety Records in the Mining and Allied Industries, by R. G. Warncke and S. M. Walker. U.S. Bureau of Mines, I.C. 7482. 24 pp. 8x10¼-in.; paper; mimeo. Free; Publications Section, 4800 Forbes St., Pittsburgh 13, Pa. Injury and fatality records of underground and open-pit iron, coal, copper and other metal mines, cement plants and quarries showing that intelligent planning, intense effort and training by management, plus worker cooperation, mean better mine safety.

Stress Analysis Applied to Underground Mining Problems, Part II: Stress Analysis Applied to Multiple Openings and Pillars, by W. I. Duvall. U.S. Bureau of Mines, R.I. 4387. 11 pp. plus 21 pp. of graphs. 8x10½-in.; paper; mimeo. Free; Publications Section, 4800 Forbes St., Pittsburgh 13, Pa. How estimates can be made of the stress distribution in pillars, what factors cause high local stresses and how local stress concentrations may be reduced by proper design of mine openings.

Estimated Cost of Producing Heavy Fuel Oil by Hydrogenation of Coal, by L. L. Hirst, L. C. Skinner, E. A.

Clarke, R. W. Dougherty and H. D. Levene. U.S. Bureau of Mines, R.I. 4413. 53 pp. plus 11 pp. of illustrations. 8x10½-in.; paper; mimeo. Free; Publications Section, 4800 Forbes St., Pittsburgh 13, Pa. Investment costs for a hydrogenation plant with 10,000 bbl. per day capacity will vary from $5,800 to $7,500 per bbl. of daily capacity, with costs probably reduced for a larger plant. Cost of fuel oil from plants of this size would range from $3.07 to $4.16 per barrel with coal at $3 per ton. Most economical process appears to be hydrogenation-extraction using coke-oven gas as a source of hydrogen. Next most economical method seems to be hydrogenation-extraction at the mine, with coal gasification supplying hydrogen.

Synthetic Liquid Fuels Abstracts, Items 744-898, by J. L. Wiley and H. C. Anderson. U.S. Bureau of Mines, Vol. 1, No. 6, 69 pp. 8x10½-in.; paper; mimeo. Free; Publication Section, 4800 Forbes St., Pittsburgh 13, Pa. Very brief condensations of articles on coal gasification, Fischer-Tropsch and Bergius processes, carbonization, refining, instrumentation, etc. The Bureau can supply copies of only a very few of the papers abstracted but this publication tells where and how they may be obtained.

How to Cut Small Boiler-Plant Costs by Mechanical Coal and Ash Handling. Bituminous Coal Research, Inc., Oliver Building, Pittsburgh 22, Pa. 16 pp. 8¼x11¼-in.; paper. 40c. Suggested layouts for plants of various size, showing how to get best results, with estimates of investment and operating costs.

Two Billion Tons of Coal, by Marian S. Klein, Division of Labor Statistics, Ohio Dept. of Industrial Relations, Columbus, Ohio. 79 pp. 8½x11-in.; paper. Historical statistical survey of coal mining in Ohio from 1838 to the present, with comments on safety, mechanization and future developments.

Tentative Standards of the Hydraulic Institute: Pipe Friction. Hydraulic Institute, 90 West St., New York 6, N.Y. 82 pp. 8½x11¼-in.; paper. Charts and tables on friction loss for water, friction loss for any fluid, friction factors, valves and fittings, viscosity, etc.

Briquetting Illinois Coals Without Binder, by R. J. Piersol. Illinois State Geological Survey, Urbana, Ill., Bulletin 72. 198 pp. plus tables and figures. $1; one copy free to Illinois residents and to public libraries until Mar. 1, 1949, upon payment of 12c postage.

Shipping Coal Mines Map of Illinois as of Sept. 1, 1947. 30x51-in. Color. 35c; one copy free to Illinois residents and to public libraries until Mar. 1, 1949, upon payment of postage—folded, 4c; rolled 15c.

A GREAT NEW TIRE THAT GOES IN OFF-THE-ROAD • GETS THE LOAD • AND CARRIES IT OVER THE HIGHWAY

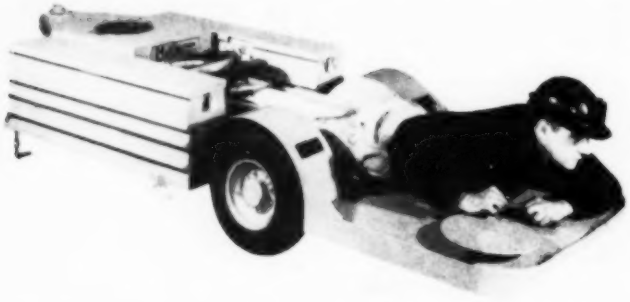
Here, without question, is the greatest tire ever made for trucks that work most of the time on the highway and some of the time on unimproved, rough surfaces.

A massive tire to carry heaviest loads. 50% more tread rubber; tremendous, tough shoulders, practically snag proof. With free rolling ribs for highway travel and tractor-traction cleats for soft going.

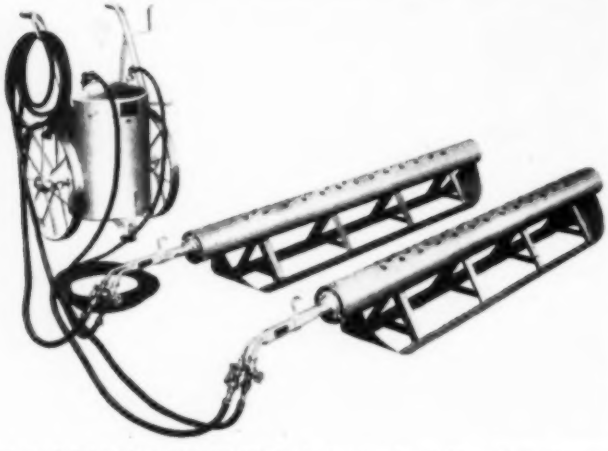
THE GENERAL TIRE & RUBBER COMPANY • Akron, Ohio

Equipment News

More Detailed Information and Descriptive Literature Normally Are Available on Request Directly to the Manufacturer

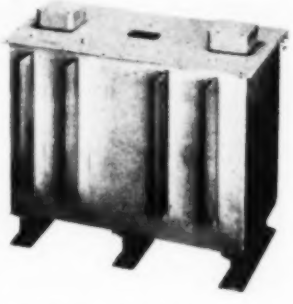


NEW PERMISSIBLE underground car designed for supervisors or others who must travel in low seams is known as the "Trike," features a three-wheel construction and is built to carry up to 500 lb. The one-man model is 36 in. wide, has a 6-in. ground clearance and an over-all height of 22 in. with man in prone position. Rear-wheel steer is said to permit it to spin about in a 9-ft. entry. A two-man model available is 48 in. wide. The 1½-hp. motor is powered by a 20-volt 162 amp.-hr. battery with a normal capacity of 5 miles of travel. Either d.c. or a.c. automatic charging equipment is available for recharging the battery in eight hours, it is said. The Trike has a speed of 3 to 4 m.p.h. on level ground and reportedly can negotiate grades of 20 percent or better. Inquiries regarding the Trike, which is manufactured by the Baker-Raulang Co., Cleveland 13, Ohio, should be addressed to the J. H. Fletcher & Co., exclusive sales representative, Huntington 1, W. Va.



COAL-CAR THAWING EQUIPMENT—An improved portable coal-car thawer, said to thaw a frozen two-hopper car sufficiently for dumping in ½ to ¾ hour, has been announced by Hauck Mfg. Co., 124 10th St., Brooklyn 15, N. Y. Thawing is done by perforated steel tubes that slide directly underneath the hoppers, each tube throwing a series of evenly distributed intense, smokeless heating flames upward and covering the entire width. The heat generated is under instant control of the operator and the unit is fully portable, requires no installation expense and is simple to operate, it is said.

COLD-WEATHER STARTING—Use of a special patented quick-starting device with its Chevron starting fluid has overcome cold-weather starting difficulties with diesel- and gasoline-powered engines, according to the California Oil Co., 225 Bush St., San Francisco 20. Basically an ethyl-ether compound, Chevron now is packed in gelatine capsules, in either 17-cc. and 7-cc. sizes, which are used with a special puncturing tool and priming system to inject the fluid into the intake manifold. The fluid flows at 70 deg. F. below zero, contains additives that lubricate as the engine is started, and will not corrode metal parts, it is said. The new priming system has been endorsed by all leading diesel-engine and heavy-road machinery manufacturers in the United States, the company reports.



RECTIFIERS—New Celab tank rectifiers announced by Clark Electronic Laboratories, Palm Springs, Calif., made entirely of aluminum for ready portability, are available in oil-cooled models for surface installation and air-cooled for underground use. The 100-kw. units supplying 275 volts d.c. from 2,300/4,000-volt 60-cycle three-phase line may be operated together to supply any total power required. They will withstand peak overloads up to 1,000 percent, according to the manufacturer. The units start instantly, create no fumes or fire hazard, are unaffected by dust and dirt, offer unlimited life and require no maintenance, the company says.

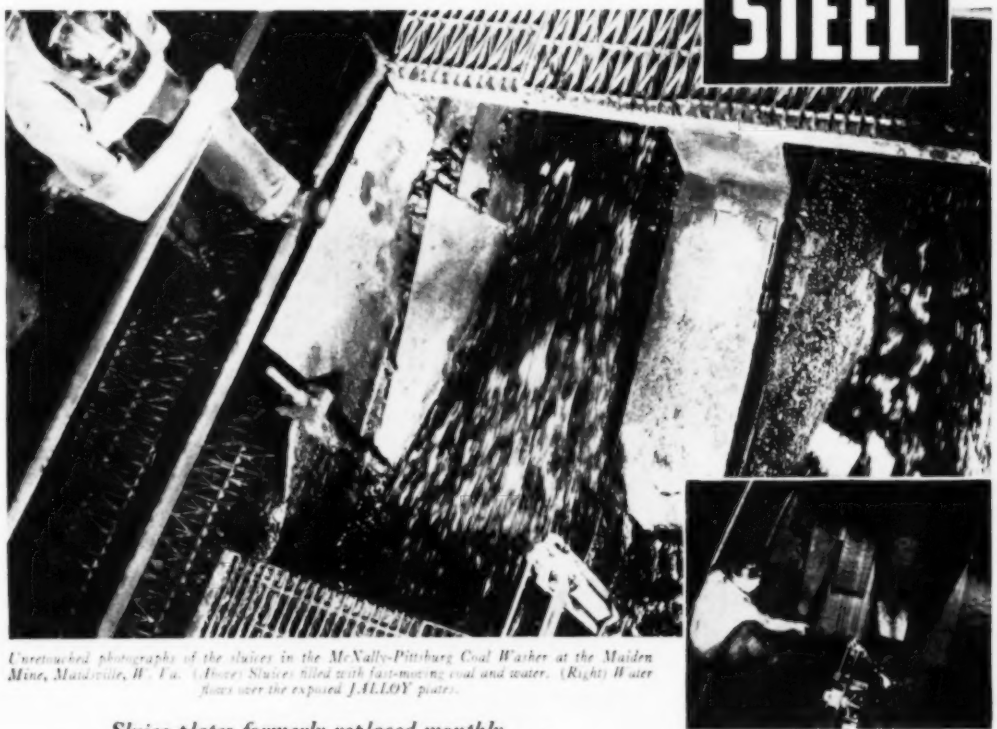
FOREMEN LEADERSHIP TRAINING—New five-lesson "Leadership" course prepared for supervisory employees in industry by International Correspondence Schools, Scranton, Pa., is said to be particularly designed

Kelly's Creek Colliery Company

solves a costly maintenance problem with

J&L HEAT-TREATED JALLOY STEEL

J&L STEEL



Unretouched photographs of the sluices in the McValley-Pittsburg Coal Washer at the Maiden Mine, Maidsville, W. Va. (Above) Sluices filled with fast-moving coal and water. (Right) Water flows over the exposed JALLOY plates.

Sluice-plates formerly replaced monthly . . .
Now heat-treated JALLOY plates last 10 times as long

Slide 300 tons of coal *an hour* day in and day out down the steel sluices of a coal washer, and you would *expect* the bottom plates to wear out rapidly. Kelley's Creek Colliery Company* considered monthly replacements quite normal for sluice bottom-plates until they put in J&L *heat-treated* JALLOY Steel. Now they get 10 times longer service. This means lower maintenance cost . . . higher profits.

But that's not all! Conveyor sides and bottoms of mild steel generally lasted 3 months at the most. A year ago JALLOY plates were installed . . . Present indications are that these plates will be in service at least *another year* before replacement is necessary. That will mean a minimum of *8 times* longer service.

JALLOY is a heat-treated, manganese-molybdenum steel developed by J&L for just such uses as these for resisting extreme abrasion and heavy shock.

Manufacturers and maintenance men, alike, find that JALLOY heat-treated plate makes equipment last longer. The outstanding wear-resistant properties of this *modern* steel have been proved again and again in such applications as: Bulldozers . . . Scrapers . . . Rock crushers . . . Power-shovel buckets . . . Dump cars . . . Truck bodies . . . and Sand-blast equipment.

If abrasion is a limiting factor in the life of *your* equipment or products, you'll find it profitable to investigate JALLOY. Let us send you the booklet mentioned in the coupon.

Jones & Laughlin Steel Corporation
411 Jones & Laughlin Building
Pittsburgh 30, Pa.

☐ Please send me your booklet: "JALLOY J&L Alloy Steel."

☐ Do you recommend Jalloy for:

.....

Name .....

Company .....

Address .....

.....

*Subsidiary of The Valley Camp Coal Co., Cleveland, O., producers of "Valley Camp" coal.

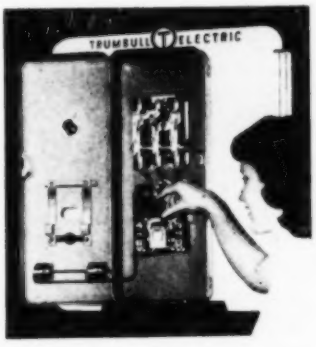
JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L manufactures a full line of carbon steel products, as well as certain products in ULTRALOY *and* JALLOY *(its stainless steels).*

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURALS AND PLATES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

to teach foremen the economic facts behind management policies and how to interpret these facts to the men under them. The course is now included as a regular part of all I.C.S. management courses and also is being used by management in training foremen groups, I.C.S. reports.

LUBRICANTS—Two new lubricants have been announced by the Pennsylvania Refining Co., Cleveland 4, Ohio. A new liquid gear shield known as "Penn Drake Gearteck" is for exposed, open and partially enclosed gears and is also suggested as a lubricant for ways, slides, wire ropes, cables and dipper sticks, as well as the swing-circular rack teeth and dipper-handle racks. Being liquid, Gearteck can be applied with a brush or swab or may be poured from container directly on the gears. Heating prior to application is not required, and Gearteck promptly sets to an almost dry film, according to the maker. A new special lubricating grease for truck wheels, track idlers and support rollers of Allis-Chalmers H-D Series track-type tractors, known as "Penn Drake A.C. Track-Roller Grease," has been approved by the A-C tractor division.



STARTER—New magnetic motor starter and magnetic contactor, designed to give maximum protection to a.c. motors up to 50 hp, 440 volts, has been announced by The Trumbull Electric Mfg. Co., Plainville, Conn. The bi-metallic relay heaters will accurately follow the heating curve of the motor, it is said, with the relay adjusting easily for automatic or manual reset when a simple lever is moved. The plastic-encased coil is designed to provide greater life for the windings by protecting them from moisture, corrosion and abrasion. A permanent self-lubricating composition is impregnated into the plastic, which will reportedly keep the magnet guides sliding smoothly and at the same time eliminate annoying low-voltage chatter.

FIRE EXTINGUISHER—"Emergency Fireman" containing 2 lb. of Ansul "Plus-Fifty" dry chemical, designed by the Ansul Chemical Co.,

NATIONAL ELECTRIC

TYPE SH-D

Indestructo

PORTABLE POWER CABLES

- Coated Copper Conductor
- Performance Grade Insulation
- Rubber Filled Tape
- Grounding Conductor
- Tinned Copper Shielding Braid
- Open Seine-Twine Braid
- Outer NEOPRENE Jacket

Have Tough, Durable NEOPRENE Jackets—They have the Abrasion Resistance strip-mining operations need

You can't expect operators of draglines and power shovels to "baby" trailing power cables. Taking all the care possible, it's still a tough job for *any* cable. That's why we build lots of *abuse resistance* into NE *Indestructo* cables.

The abuse that trailing cables must take soon reveals their built-in stamina and quality. You'll find that *Indestructo* means *—greater safety . . . longer life . . . fewer replacements.*

Let us send you our new Mining Machine Cable Catalog. Also see NE *Indestructo* listings in "Mining Catalogs."

NE *Indestructo* Type SH-D. Recommended above all other types for maximum safety and where potentials are over 2,000 volts. Each insulated conductor has individual tinned copper shielding braid. Grounding conductors are laid in the valleys for compact cabling. A reinforcing braid, vulcanized between the inner and outer Neoprene jackets, imparts a "tire-like" quality to the sheath, and increases the ultimate tensile strength.

The tough, durable Neoprene sheath, vulcanized in a continuous lead mold, insures a dense, smooth, long-wearing jacket which resists flames and abrasion, cutting, chipping protects the cable against oils, grease, heat and acidulous waters.

Pennsylvania Flame Act 206: Where required, "P-106" embossed on jacket is approval number.

National Electric
PRODUCTS CORPORATION
PITTSBURGH 30, PA.

A COMPLETELY NEW COAL DRILL that is self-propelled and operated by one man from the control seat has been announced by the Paris Mfg. Co., Paris, Ill., for strip-mine use. The machine has a drilling speed in No. 5 coal of up to 5 f.p.m., according to the company, which also points out that a minimum of time is lost between hole locations as the operator can both drill and move the unit from the control seat. The drill is hydraulically fed and the gearing is enclosed in oil-tight cases.

Marinette, Wis., for effective use by inexperienced operators, is said to provide maximum protection for flammable liquid and electrical fires and to be rechargeable on the spot after use. The chemical used is reportedly non-toxic, a non-conductor of electricity, non-corrosive and non-abrasive and as it will not deteriorate, solidify or evaporate, does not require periodic recharging. With the fill cap on the unit built into the mounting bracket, the extinguisher is ready for instantaneous use.

TRUCK—Four Wheel Drive Auto Co., Clintonville, Wis., has announced that production of its Model YU rated at 28,000 lb. g.v.w. has been resumed with the addition of new design features and improvements that are said to provide greater driver comfort, ease of driving, serviceability and adaptability. The new Model YU features a 142-hp. motor rated at 2,250 r.p.m. The standard wheelbase is 150 in., with options up to 182 in. and body space back of the cab from 121 to 190 in. The unit reportedly is adaptable to a number of specialized heavy-duty truck applications.

SPEED REDUCER—A new single-reduction speed reducer in the "baby" size has been announced by the Ohio Gear Co., 1400 East 179th St., Cleveland 10, Ohio. The new BHS unit is a right-angle drive with input shaft below and the worm gear or output shaft above. Over-all dimensions are:

Kennametal Bits

Can Bring You . . . 35 Times More Footage Between Bit Changes . . . 25% Faster Drilling

You can drill better and at lower cost with Kennametal "Solid Head" Drill Bits. They drill straight, uniform, single gage holes, stay sharp longer, and drill up to 20% more footage per shift. Because of this, both operating and bit costs are reduced, and drillers are relieved of the burden of repeatedly pulling and re-installing sectional augers.

The cutting edges of Kennametal Bits — **hard, durable Kennametal** — resist shock, abrasion and wear, far better than any other tool material. The prongs are angled to "bite" into tough, non-uniform materials, take hard shock, and move the material freely on to the auger.

Kennametal "Solid Head" Bits are available in sizes from 3¾" to 9". Write today for Catalog M-5 which gives full particulars on this and other Kennametal cutting and drilling tools.

"DRILLS 7,000 FEET OF SLATE, SHALE, AND EARTH BEFORE RE-SHARPENING . . ."

Says West Virginia user

". . . in the same ground steel bits gave us a maximum life of about 200 feet. The Kennametal bit drilled 35 times longer before it was dull and it can be sharpened several more times."

"25% MORE FOOTAGE DRILLED PER SHIFT . . ."

Reports an Eastern Ohio User of Kennametal Bits

". . . and we get better drilling in hard material . . . for example, a Kennametal Bit, used in hard material, drilled 54 feet in 12 minutes!"

THESE KENNAMETAL TOOLS ARE REDUCING MINING COSTS —INCREASING OUTPUT

KENNAMETAL Two-Prong Drill Bits for post, mounted, and push drills in sizes 1⅜", 1½", 1⅝", 1¾", 1⅞", 2", 2¼", 3½".

KENNAMETAL Mining Machine Bits for chains that accomodate conventional ½" x 1" bits.

KENNAMETAL Rock Bits in sizes of 1⅜", 1½", 1⅝", 1¾", 2", 2⅛", 2½", 3".

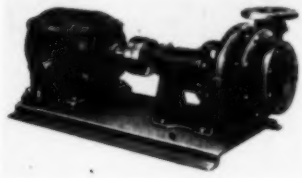
KENNAMETAL Finger Bits for conventional drill heads.

KENNAMETAL®

Mining Division · Kennametal Inc., Latrobe, Pa.

World's Largest Manufacturer of Cemented Carbide Mining Tools

4¾ in. long, 3 in. wide, and 6¼ in. high. Ratios available range from 6:1 to 58:1, input horsepower is from ⅛ to ⅝ and output torque (1,800-r.p.m. input) ranges from 103 to 168 in.-lb.



PUMP—New centrifugal pump announced by Goulds Pumps, Inc., Seneca Falls, N. Y., as specially designed to pump clear liquids is said to offer compact simple construction with high operating efficiency, ease of installation and maintenance. The unit is availble in 14 sizes for both motor and belt drives, at capacities from 10 to 1,800 g.p.m. with heads to 120 ft., and in standard fitted and all-iron construction.

ELECTRIC HOISTS—New line of Speedway electric hoists in capacities from 1,000 to 20,000 lb., with a design incorporating all-steel construction and gear train plus Tru-lay Preformed cable and swaged-on cable fittings, has been announced by Wright Hoist Division, American Chain & Cable Co., Inc., York, Pa. The units are furnished in various types and are built for 220-volt, three-phase a.c. current reconnectable for use on 440-volt three-phase a.c. They also can be furnished for 115-volt and 230-volt d.c. and for other voltages and frequencies.

PNEUMATIC EQUIPMENT OILER—New L012 automatic line oiler said to prevent running rock drills or other air-actuated equipment without adequate lubrication has been announced by Gardner-Denver Co., Quincy, Ill. The unit shuts off the line air automatically when all the oil in the 1-pt. reservoir has been used. It is said to deliver a carefully metered flow of atomized oil from any position, either vertical or horizontal, and to efficiently lubricate any pneumatic equipment using from 25 to 500 cu.ft. of air per minute.

SELECTIVE HARDENING—Its new "Isopac" paste for application to sections to be kept soft while the work is case-hardened prevents the penetration of carbon gas and insulates the protected section to prevent rapid

2 Euclids PLUS 1 Shovel PLUS 8 Hours EQUAL 1,965 TONS OF LIMESTONE

Flared sides of the rugged Euclid body speed loading by large shovels and reduce spillage. Smooth body interior, high dumping angle and distance of chute from rear wheels assure fast, clean dumping into hoppers or over the edge of stock piles and waste banks. The frame is a backbone of unmatched strength, built to last for the life of the unit.

● When this mid-western plant was completely modernized, Euclids were chosen to haul overburden and stone. Two Rear-Dump Euclids of 15 ton capacity replaced a fleet of highway trucks and easily handle the output of a 4 yard shovel. On a round trip haul of 3,000 feet, these quarry type "Eucs" average 131 trips every eight hours with capacity loads.

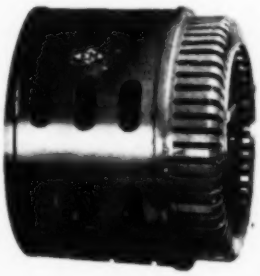
Dependable continuous performance of the Euclids assures a steady flow of limestone to the primary crusher. The low maintenance and operating cost of the "Eucs", as proved by company records, has reduced the cost per ton of material hauled.

If you want equipment to haul big loads fast and at low cost, the recommendations of a hauling equipment specialist are available without obligation. Write or call your Euclid distributor for complete information.

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

EUCLIDS *Move the Earth*

cooling, according to Denfis Chemical Laboratories, Inc., 172 Pacific St., Brooklyn 2, N. Y. It reportedly can be applied in any method used to carburize the work, will not crack or shrink and is easily removed after quenching.

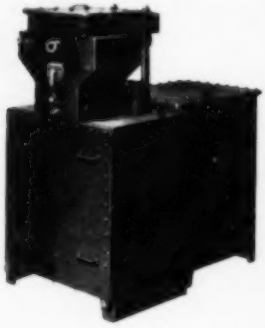


ELECTRIC MOTOR—New line of extra-low-starting-kva. squirrel-cage induction motors has been announced by Electric Machinery Mfg. Co., Minneapolis 13, Minn. Called Design X, the new line is available in a flange-mounted and coupled two-bearing type for direct coupling to 514-, 600- and 720-r.p.m. air compressors. The units permit full-voltage starting with a starting kva. of only 425 percent, the manufacturer reports. The motors are available from 60 to 250 hp., in speeds of 514 to 720 r.p.m., at 60 cycles.

TRUCKS—Marmon-Herrington Co., Inc., Indianapolis, Ind., has announced a new line of heavy-duty "All-Wheel-Drive" converted Ford trucks, identified as the Q Series, which includes three four-wheel-drive models rated at 21,500 lb. g.v.w. and three six-wheel-drive models rated at 35,000 lb. g.v.w. Wheelbases range from 136½ to 220 in. The new units use the Ford F-7 models as a basis and are powered by the Ford 145-hp. V-8 engines. They reportedly are specially suited to off-the-road operation.

CHAIN SAW—New heavy-duty two-man chain saw announced by Henry Disston & Sons, Inc., Philadelphia, is said to easily handle cutting wet, frozen, or hard wood. A 12-hp. lightweight Mercury gasoline engine, with full precision-bearing construction throughout, reportedly offers increased performance and lower maintenance costs. A new transmission housing, automatic chain lubricator, a quickly detachable tailstock and vari-

able chain tensioning are among the other design improvements.

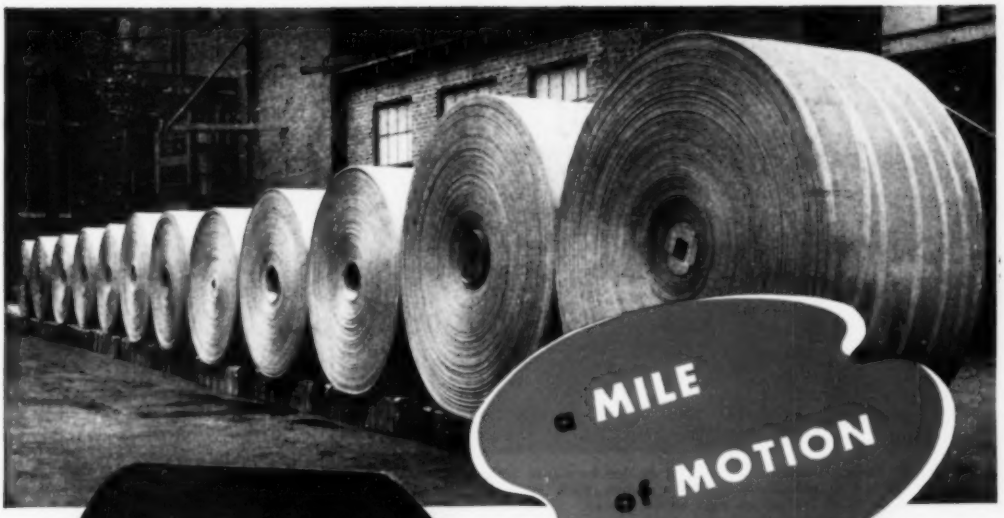


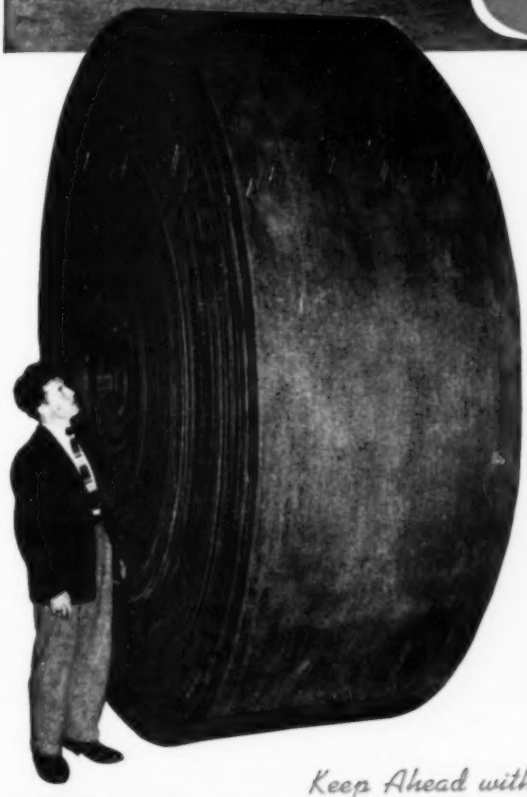
MOTOR STARTER—For use in Class I Group D hazardous locations, The Electric Controller & Mfg. Co., Cleveland 4, Ohio, has announced a new combination starter (with self-contained disconnect switch) for squirrel-cage, synchronous and wound-rotor motors up to 600 hp. at 2,300 and 4,600 volts, 60 cycles. Known as the "Valimitor," the unit provides unlimited short-circuit protection and regardless of the available kva. of the power system limits a fault current in the motor circuit to 25,000 kva., the company says. For 25-cycle power circuits, the maximum rating is 300 hp. at 2,300 volts and 250 hp. at 4,600 volts.

PAINT PRIMER—Designed to eliminate the necessity of removing all rust or having the surface perfectly dry before painting, its "RUST-O-Primer," a vinyl-base, quick-drying wet primer, is applicable over wet or dry, clean or rusted metal including steel, aluminum or galvanizing, to provide a hard paintable foundation for any type of paint, according to The Wilbur & Williams Co., Greenleaf & Leon Sts., Boston 15, Mass.

FIRE EXTINGUISHER—New No. 30 Alfco hand-portable dry-chemical-type fire extinguisher has been announced by American-LaFrance-Foamite Corp., Elmira, N. Y. The dry chemical is said to be non-toxic, non-corrosive and a non-conductor of electricity. It will not freeze and is recommended by the manufacturer for flammable liquid and electrical fires.

MINE JACKS—Two new mine jacks designated as Models MRT (mine roof-timber jack) and MSP (mine safety-post jack), announced by Star Jack Co., Elmwood Park, Chicago 35, are made of high-grade aluminum alloy, said to make them 35 to 50 percent lighter in weight than similar equipment constructed of malleable iron and steel. Setting-up time for Star jacks reportedly is minimized by a spinning hand wheel, a half turn





ON MANHATTAN CONVEYOR BELTS

Pictured here are conveyor belt shipping scenes that are typical of the month-in, month-out deliveries that leave the Manhattan plant for all parts of the world. The twelve rolls above represent a mile of motion for the handling and preparation of iron ore in a prominent steel mill. Some of these Manhattan conveyor belts are 60" wide. At left, is a towering roll of 1360' of 6-ply, 42" wide Manhattan Conveyor Belt ready for shipment to an Arkansas clay pit, where it will carry abrasive haroid clay in lump form.

There is tremendous demand for Manhattan Conveyor Belts for underground and strip mining and preparation plants; for quarries and sand and gravel plants; for construction; and for chemical and other industries.

Manhattan maintains leadership with developments like HOMOCORD, the "Rippling Muscles" construction that troughs easily and cushions heavy load impacts . . . and RAY-MAN, the first "Tension-Master" construction using rayon cord strength members designed for heavy-duty, long life operations. Whatever your conveying problems may be, get advice from your Manhattan Engineer.

Keep Ahead with Manhattan

RAYBESTOS R M MANHATTAN

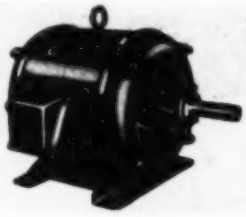
RAYBESTOS-MANHATTAN INC.

MECHANICAL RUBBER PRODUCTS — RUBBER COVERED EQUIPMENT — FRICTION MATERIAL — ASBESTOS TEXTILES
PACKINGS — POWDERED METAL PRODUCTS — ABRASIVE & DIAMOND WHEELS — BOWLING BALLS

MANHATTAN RUBBER DIVISION **PASSAIC, NEW JERSEY**

of which permits instant raising and lowering of the screw. Model MSP has a screw travel of 15 in., with a 16-ton capacity. The MRT has a screw travel of 36 in. and an 8-ton capacity. Both are furnished in various heights.

IMPACT WRENCH—New Thor ⅜-in. universal electric impact wrench has been announced by Independent Pneumatic Tool Co., Aurora, Ill. Weighing 6 lb. 14 oz., the new "Packy" wrench is said to have many applications, including driving nuts, bolts and cap screws, driving and removing studs and machine screws, step-drilling or reaming holes, wood boring, tapping and driving rotary files, burring tools, wire brushes, etc. It operates on a.c.-d.c. 60 cycles.



ELECTRIC MOTORS—Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 14, Mo., has announced that the design used in its drip-proof motors in frames 225 and smaller is now being utilized for its polyphase motors in the 254, 284, 324 and 326 frames. The motor frames of the new units are formed of heavy rolled steel. An auxiliary fan draws in air through the openings in the front endplate, forces it through the ventilation passages and out through the endplate openings on the drive end. Screens on the endplate openings give added protection from foreign matter. Both sleeve-bearing and ball-bearing motors of the new design are completely drip-proof in the normal horizontal position and in the sidewall or ceiling horizontal positions when properly mounted.

PACKING—New ring packing, said to eliminate the damaging effect of extrusion of packing material into the clearance space between the mating parts, has been announced by Greene, Tweed & Co., North Wales, Pa. Known as the Palmetto G-R ring, the packing is said to be applicable in any hydraulic or pneumatic system where a positive seal is necessary, as a static seal where there is constant or impulse pressure, and in systems where there is reciprocating motion with either constant or impulse pressure, the company states. It is not applicable to those systems employing continuous rotary motion.

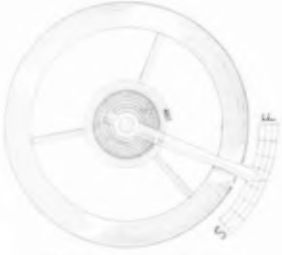
SAFETY SHOE—A new Goodyear-welt safety shoe said to be especially suited for wear by miners and electri-

Speaking of Wheels . . .

Exciting . . . but not dependable

Dependable . . . if in the right hands

Sturdy . . . but ancient and slow



Precise . . . but delicate

Speedy . . . but fragile

Always runs . . . if it rains

STERLING CAST STEEL WHEELS

will save you money. Give us the opportunity of explaining the advantages of the design and workmanship of the STERLING CAST STEEL wheel. Save power by using Sterling's balanced design wheels.

REPRESENTATIVES: J. E. Nieser, 720 Roselawn Ave., Pittsburgh, Penna.—R. E. Gredetz Equipment Co., Commercial Bldg., Bluefield, West Virginia—Wetzel Equipment Agency, 118 West Third South, Salt Lake City, Utah—Wilkes-Barre Equipment Co., Miner's Bank Building, Wilkes-Barre, Penna.

PRECISE — STURDY DEPENDABLE and ENDURING

cians has been announced by Iron Age division, H. Childs & Co., Inc., Pittsburgh 22, Pa. It is made of genuine tan horsehide, with uppers cut from the shell of the horse butt, and, even after being soaking wet, the shoe will dry out soft, according to the company. It has a heavy composition sole, with a vulcanized heel and stitched heel seat, and no nails are used in its construction.

VALVE—New Fig. 976-A plug-type bronze globe valve for 300-lb. service, announced by Jenkins Bros., 80 White St., New York 13, is said to be especially suited to a variety of severe services in the close regulation of steam. Features which make for long wear, the company says, include the design and construction of the "Armor Seat" and "Slip-on Stay-on" plug and spindle, all built of special alloy steel. The valve is available in sizes from ¼ to 2 in.

TAKE-UP UNITS—The Fafnir Bearing Co., New Britain, Conn., has announced a new Type LTU series of take-up units said to be especially adaptable for conveyor construction, shaft-adjustment and belt-tightening devices. Available in shaft sizes from ¾ to 2 7/16 in., the units reportedly incorporate pre-lubricated, self-aligning Fafnir wide inner ring ball bearings with exclusive self-locking collars and frictionless Mechani-Seals. The Mechani-Seal construction, according to the manufacturer, provides the effective sealing operation of an unusually long labyrinth with that of an external slinger. An inner steel plate attached to the bearing's outer ring retains the lubricant, while a rotary slinger attached to the bearing's inner ring throws off contaminents, it is said.

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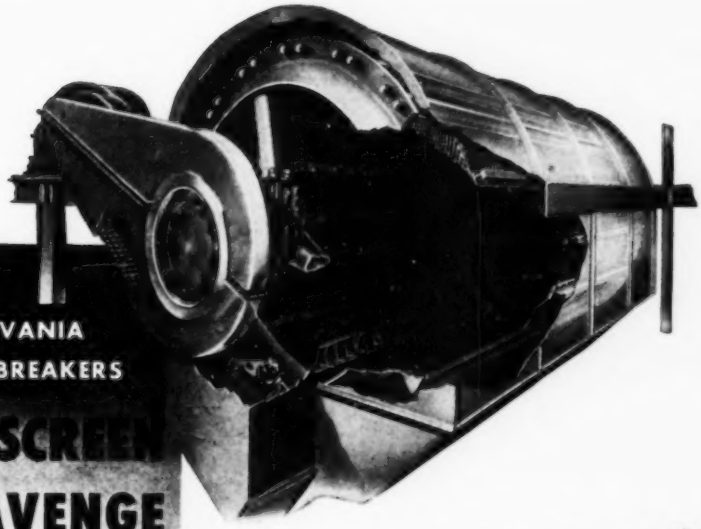
Industrial Notes

Hazard Insulated Wire Works Division, The Okonite Co., Wilkes-Barre, Pa., has named Thomas R. Weichel, formerly of the United States Bureau of Mines, a mining electrical engineer in its sales department. He will work closely with the company technical and production departments, as well as sales, in developing cable designs to aid in mine electrification. A graduate of Pennsylvania State College, with degrees of Mining Engineer and Electrical Engineer, Mr. Weichel has served with various mining companies in capacities ranging from electrician to mine foreman and for the last six years has been associated with the Bureau as a mining electrical engineer.

Atlas Powder Co., Wilmington, Del., has announced three changes in its



PENNSYLVANIA
BRADFORD BREAKERS

CRUSH, SCREEN and SCAVENGE

ALL IN One OPERATION!

The Pennsylvania Bradford Breaker pays off big by making "full seam" mining both practical and economical. It crushes by gravity impact with continuous screening, producing a uniform product with maximum large sizes and few fines, and automatically removes tramp iron, mine timbers and other refuse—the headache of coal preparation. The development and improvement of Pennsylvania Bradfords has been a continuing process for more than forty years—in fact a number of installations made forty years ago are still giving daily service.

Special study is given each coal preparation problem. Since no two cases are exactly alike, the relative hardness and other characteristics of coal and impurities, along with the methods of mining, loading and washing, must be known to make proper recommendations. That's why we test the coal in our own testing plant in conjunction with a field survey.

PENNSYLVANIA CRUSHER COMPANY

PHILADELPHIA

DIVISION OF BATH IRON WORKS CORPORATION

Liberty Trust Bldg., Philadelphia 7, Pa.

New York • Pittsburgh • Chicago • Los Angeles • Birmingham—Associated with Fraser & Chalmers Engineering Works, London

Manufacturers of a complete line of crushing equipment • Hammermills • Single Rolls • Roadmills • Jaws • Gyratories • Granulators • Impactors • Bradford Breakers

midwestern explosives-sales organization. D. J. Carroll Copps, formerly manager of the company's Chicago district explosives sales, has been appointed manager of Joplin, Mo., district sales, succeeding R. E. Caskey, who is taking over general advisory duties on explosives sales in the midwestern area. John F. Flippo, assistant manager of the Chicago district, succeeds Mr. Copps.

Wilkes-Barre Iron Mfg. Co., Wilkes-Barre, Pa., has named as president, Ralph O. Smith, formerly general sales manager, Vulcan Iron Works.

Hewitt-Robins, Inc., New York, has named Bernard H. McGuiness, formerly works manager of its Passaic, N. J., plant, vice president of its Robins Conveyors division. Mr. McGuiness, who joined the company in 1923, was for many years general superintendent of installations for Robins Conveyors division.

The Electric Storage Battery Co., Philadelphia, has named Robert L. Sommerville assistant general sales manager. Mr. Sommerville, formerly manager of automotive sales, has been associated with the company for 30 years. The company also has announced the consolidation of the railway and motive-power sales activities and the appointment of Wm. Van C. Brandt as manager of this new Exide division, to be known as railway and motive-power sales. Mr. Brandt previously had been manager of Exide motive-power battery sales.

Taylor Forge & Pipe Works, Chicago, has appointed Thomas J. Lingle western division manager in charge of manufacturing operations at its new Fontana, Calif., plant. Mr. Lingle, who also will direct west coast sales, formerly was associated with C. F. Braun Co., Alhambra, Calif., and since 1946 has operated his own valve and fittings business in Alhambra.

R. G. LeTourneau, Inc., Peoria, Ill., has announced several changes in its sales staff. M. B. (Jack) Crowley, who has had many years' operating experience in coal and metal mines, has been named district sales representative in Virginia, West Virginia, North and South Carolina, with offices in Raleigh, N. C. Jim Sevick, who until recently was associated with Johns-Manville Corp. and at one time was mining engineer and assistant mine superintendent, Industrial Collieries Corp., has been named district sales representative for Oklahoma, Arkansas, Mississippi, Louisiana and western Tennessee. Fran W. Duke, formerly on the company's service training staff and associated with LeTourneau distributors for the past several years, has been named district sales representative in lower New York state, upper New Jersey, Pennsylvania and Maryland.

De Laval Steam Turbine Co., Trenton, N. J., has announced the follow-

ing executive changes: Henry W. Johnson has retired as vice president in charge of manufacturing, but continues as a director and member of the executive committee. C. Richard Waller has been named vice president and director for engineering, and H. G. Bauer, vice president and executive engineer. J. P. Stewart, manager, commercial sales division, has been elected a vice president. W. A. Reynolds has assumed responsibility for the development and merchandising of new small products, in addition to his position as manager of the present IMO pump and worm gear divisions. W. A. Neumann Jr. has been appointed controller.

Hercules Powder Co., Wilmington, Del., has appointed Milo A. Nice assistant manager of its explosive department's technical service division. Mr. Nice will be succeeded as assistant manager of the explosives department's New York office by Arthur H. Sibley, a special representative in that office.

General Electric Co., Schenectady, N. Y., has elected as vice president Clarence C. Walker, general manager of its construction-materials department at Bridgeport, Conn. Mr. Walker, who joined GE in 1921, recently became general manager of the recently formed department, and before that was engaged in customer relations work in the New England area as a commercial vice president.

Bucyrus-Erie Co., South Milwaukee, Wis., has appointed Wilkinson & McLean Ltd., Calgary, Edmonton, and Lethbridge, Alberta, Canada, distributors for Bucyrus-Erie blasthole drills, prospecting drills, and bit dressers. The company also handles Bucyrus-Erie excavators, electric quarry and mining shovels, and walking draglines.

Firth Sterling Steel & Carbide Corp., McKeesport, Pa., has appointed Michael N. W. de Berardinis manager of sales promotion and advertising. Mr. de Berardinis formerly was with the sales promotion and advertising department of Westinghouse Electric Corp.

Link-Belt Co., Chicago, has appointed R. E. Whinrey, formerly superintendent of the Link-Belt Dodge plant in Indianapolis, to the newly created post of assistant general manager of that plant. L. C. Heinlein, formerly assistant superintendent, has been appointed superintendent of the plant.

United States Steel Supply Co. and **Carnegie-Illinois Steel Corp.**, U. S. Steel subsidiaries, Chicago, have announced the appointment of George O. With as assistant vice president of the supply company. Mr. With, who has been manager of sales, construction industries, for Carnegie-Illinois since 1937, has been succeeded by Dwight L. Merrell, his assistant for the past 1½ years.

Continental Gin Co., Birmingham, Ala., has reported that Martin Elmer Conry, 58, for the past six years mining engineer for its industrial division, died Dec. 27 in a hospital in Birmingham. For 13 years previously Mr. Conry had been general superintendent, Norton Coal Corp., Nortonville, Ky., and was widely known throughout the Alabama, Tennessee and Kentucky coal fields.

Joseph T. Ryerson & Son, Inc., Chicago, has elected William Seymour Jr., vice president, C. L. Hardy, assistant vice president, and Thomas G. Miller, secretary. W. A. Redpath, assistant manager of sales, Chicago plant, has been appointed manager of the Philadelphia plant to succeed Mr. Hardy. The company also has announced the start of construction of an addition to its Chicago plant that will provide approximately 118,000 sq.ft. of modern plant and office space and that is reported to be the initial move in a series of planned additions and improvements, which ultimately will result in large-scale expansion and modernization of the entire Chicago property.

Syntron Co., Homer City, Pa., has named Ernest K. Hood district sales manager of its new sales office in Kansas City, Mo.

Western Machinery Co., San Francisco, has added J. Stanley Huckaba to its staff, with headquarters in WEMCO's Spokane office. Mr. Huckaba will be concerned with metallurgical sales and service for the WEMCO equipment division and the Western-Knapp Engineering Co. division in the Intermountain territory.

Raybestos-Manhattan, Inc., Passaic, N. J., has opened a new Seattle warehouse and office at 314 Occidental Ave. The new facilities, in charge of Russell G. Heuman, will carry a complete stock of industrial rubber products for the industrial requirements of the area.

Cutler-Hammer, Inc., Milwaukee, Wis., has moved its Indianapolis sales office to expanded quarters at 644 East Maple Rd., Indianapolis 5. F. W. Gilchrist is manager of the office, which is a branch of the company's Chicago district office.

American Optical Co., Southbridge, Mass., has purchased a 6-acre tract at Stamford, Conn., to create a research laboratory for the expansion of its research program. The property includes a year-old building with 13,000 sq.ft. of floor space, which will be completely remodeled. According to the company, activities in the new laboratories will supplement and be in addition to research at its present two plants. "An entirely new scientific staff will be organized at Stamford to pursue work in fields related to the optical sciences and to scientific instruments, as well as research bearing directly on the company's products and processes," it said.

If you want a machine for loading coal exclusively, you will want an "Automat" for loading it fast, at lowest cost and doing it safely. But, all mines are not so fortunate as to have only the loading of coal to consider. For instance, in thin seam mines taking top and bottom rock to increase height of entries is slow and expensive when done by hand. The Whaley "Automat", with its ability to load heavy abrasive material, makes it possible to greatly increase speed of such work at tremendously decreased costs.

The "Automat" is built to meet the demands for rapid entry development in thin seams . . . for quick clean-up of falls . . . for reopening of old workings . . . for pillar recovery . . . for making grades, etc., and to take all this work in its stride.

The handling of slate or rock in an economical manner ceases to be a problem where the Whaley "Automat" is used, for this machine will load slate or rock equally as well as coal and do so with practically no increase in maintenance cost. The "Automat" is built to do the tough jobs and this accounts for the comparative ease with which the "Automat" does the lighter job of loading coal . . . and at minimum maintenance cost.

Its exclusive shoveling action makes possible the equally satisfactory operation in loading coal, slate or rock . . . one machine for all loading regardless of the type of material or the size of the job to be done. Myers-Whaley Co., Knoxville, Tenn.

Remember, the "Automat" loads, in its stride, any lump of coal that will pass through your tipple, or any lump of rock your cars, aerial tram or larries can take.

MYERS-WHALEY

"Mechanical Loaders Exclusively for Over 40 Years"

Trade Literature

Available Without Charge on Request to the Manufacturer

MINE COMMUNICATION SYSTEM—United States Instrument Corp., Dept. E., Summit, N. J. Bulletin describes the U.S.I. "Sound-Powered" permissible telephone system, which requires no batteries or outside power. High frequency hand-operated generator and howler are used for selective signaling of up to 24 stations, with actual transmitting power created by vibration of the voice, it is said.

EMPLOYEE HOUSES—National Homes Corp., Lafayette, Ind. Two bulletins illustrate interiors and exteriors of a variety of factory-built two-, three- and four-bedroom one-story homes that may be erected on any location by the manufacturer's crews. Details of design and construction, equipment and available variable features are covered, along with floor plans of the numerous models.

MAGNETIC DETECTOR—Dings Magnetic Separator Co., 4740 West McGeogh Ave., Milwaukee 14, Wis. Bulletin No. B-1901A describes the Dings high-intensity magnetic detector designed for detecting tramp iron on conveyor belts or in chutes wherever high belt speeds or depth of burden prevents effective magnetic separation by other means. The unit is said to be adjustable to detect various sizes of tramp iron and is available for conveyor belts from 18 to 72 in. wide.

BALL BEARINGS—Norma-Hoffmann Bearings Corp., Stamford, Conn. Booklet on the company's "Cartridge" ball bearing describes its many applications and offers dimensional data, load-rating, dirt-protection; grease type, content and retention; and service information.

SWITCHGEAR AND CONTROLS—Allis-Chalmers Mfg. Co., Milwaukee, Wis. Bulletin No. 25B7095 covers the A-C line of switchgear and control devices, with descriptions and illustrations of rotary control switches, push-button stations, generator-voltage regulators, synchro-operators, current and potential transformers, oil and air circuit breakers, disconnect switches, oil-immersed contactors, d.c. relays and contactors, thermal relays, d.c. remote positioning devices, indicating lamps, resistors and terminal boards.

MAGNETIC SEPARATORS—The Ohio Electric Mfg. Co., 5900 Maurice Ave., Cleveland 4, Ohio. Bulletin No. F-2001 provides detailed information on the application, construction, selection and suspension of Ohio separation and road-sweeping magnets. It also contains detailed data on field attraction and penetration, magnet dimensions, weights and lifting capacities of all Ohio circular and rectangular separation magnets.

SAND PREPARATION—Western Machinery Co., 760 Folsom St., San Francisco 7, Calif. Bulletin No. C-1-0-1 covers the design, uses and operating characteristics of Wemco equipment for sand preparation.

ELECTRIC MOTORS—Allis-Chalmers Mfg. Co., Milwaukee, Wis. Bulletin No. 05B7150 discusses the operation and features of A-C totally-enclosed fan-cooled motors with tube-type air-to-air heat exchangers. The units are available in squirrel-cage, wound-rotor and synchronous types for vertical or horizontal installation from 150 hp. at 1,200 r.p.m. to several thousand horsepower at standard speeds of from 3,600 r.p.m. to about 300 r.p.m.

MAGNETS—Dings Magnetic Separator Co., 4740 West McGeogh Ave., Milwaukee 14, Wis. Bulletin No. B-1205A covers Dings high-intensity Perma-Plate Alnico magnets for removal of tramp iron in installations in or above wood or metal chutes, ducts, pipes, hoppers, spouts, conveyor belts, feed tables, etc. Sizes are available from 4 to 72 in. in increments of 2 in. Bulletin No. 301-A on the Dings triple-pole high-intensity rectangular magnets illustrates the use and advantages of various types of rectangular magnets.

ELECTRIC-WELDING CABLE CONNECTIONS—Tweco Products Co., P.O. Box 666, Wichita 1, Kans. Bulletin No. 7, illustrates the complete line of Tweco-tong and Hol-Grip electrode holders, Redhead ground clamps, cable connectors, terminal connectors, cable splicers, Tweco-lugs and carbon-electrode holders. New six-bracket quantity price schedule and parts information are included, along with data on the maintenance and care of electric-welding cables, connections, grounds and holders.

VIBRATING SCREENS, PUMPS AND ELECTRICAL EQUIPMENT—Allis-Chalmers Mfg. Co., Milwaukee, Wis. Bulletin No. 25B6280A describes A-C vibrating screens, pumps, motors, controls, power-generation equipment, hoists and other items for the coal industry. Operating data is supplied on its "Low-Head" and "Ripl-Flo" vibrating screens and the "Aero-Vibe" screen. The company's complete line of centrifugal pumps for every coal need is covered and also included are data on standard induction and totally-enclosed, fan-cooled and explosion-proof motors, starters, V-belt drive equipment, hoists, and power and electrical equipment, including mobile mine rectifier units.

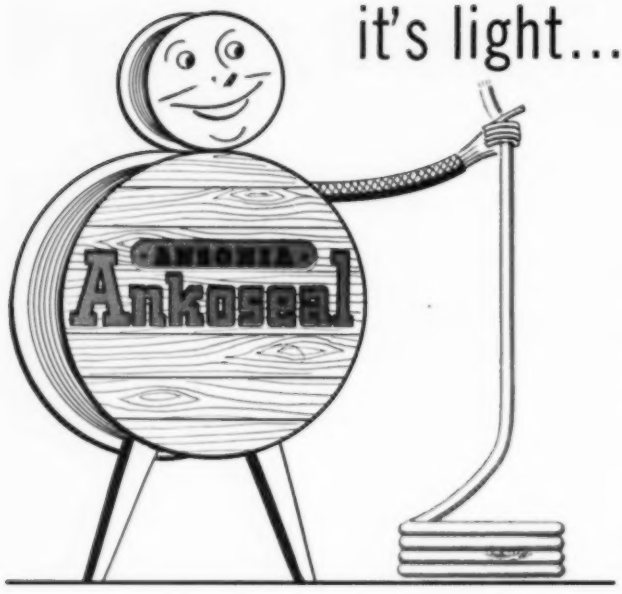
TROLLEY EQUIPMENT—National Mine Service Co., Beckley and Logan, W. Va.; Jenkins and Madisonville, Ky.; and Forty Fort, Pa. Bulletin describes the construction and features of the Bemco cable guides, trolley-wire splicer and trolley head, harp and pole.

SPEED REDUCER—The Cleveland Worm & Gear Co., 3249 East 80th St., Cleveland 4, Ohio. Bulletin presents case histories on the application of the company's Speedaire fan-cooled worm-gear speed reducer, with details of its savings in space and weight.

CLASSIFIERS—Western Machinery Co., 760-768 Folsom St., San Francisco 7, Calif. Bulletin No. C-1-5-1 describes and illustrates the construction, applications and operating characteristics of the Wemco S-H classifier.

STEEL—Joseph T. Ryerson & Son, Inc., Box 8-000-A, Chicago 80. Bulletin describes Rycut, a new free-machining alloy steel said to effect savings of 25 to 50 percent in machining time, compared with standard alloys.

PROFESSIONAL SERVICES



Light weight has obvious advantages for the coal operator. It means easier installation of permanent lines, less effort in handling portable ones. Here's a comparison to show how much weight you can save with Ansonia Ankoseal:

	Ansonia Ankoseal all-plastic underground cable	No. 6 stranded rubber and lead underground cable	No. 6 rubber insulated, neoprene jacketed cable
Weight per 1,000 ft.	148 pounds	453 pounds	185 pounds
Weight saving with Ansonia Ankoseal		305 lbs. or 67.4%	37 lbs. or 20%

Flexibility pays off too when it means a cable that really takes a lot of twisting and bending without yielding to the effects of abrasion, moisture, oil, or sunlight.

These benefits are inherent in the basic design and the vinyl type jacketing of Ansonia Ankoseal Cable . . . especially engineered for this type of service. They become your benefits, when you entrust your cable requirements to Ansonia.

Write us about your next cable needs, whether the problem is special or ordinary, whether the footage is large or small.

THE ANSONIA ELECTRICAL COMPANY

SUBSIDIARY OF NOMA ELECTRIC CORPORATION

ANSONIA, CONNECTICUT

P-G *Automatic* TRANSFER SWITCH

SINGLE OR DOUBLE TROLLEY AND REEL...

ELIMINATES SHOCKS *and* BURNS

PROTECTS *your* EQUIPMENT

PROMOTES SAFETY

ENTIRELY *Automatic* . . . P-G Automatic Transfer Switches are designed for use on all types and makes of gathering locomotives.

Automatically transfers the current from trolley to reel, or vice-versa. Hand operated switches are eliminated.

Promotes safety—avoid shocks or burns to operator while changing from trolley to reel.

Simple in design, easy to install, requires very little space, and can be mounted anywhere. Furnished complete with cover.

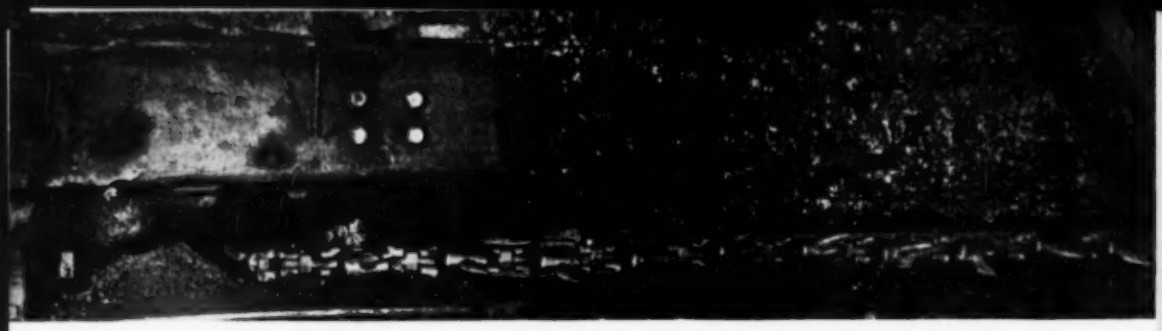
Heavy duty coils provide for positive contact through double contact assembly. Contacts are easily renewable.

P-G

THE POST-GLOVER ELECTRIC COMPANY

•ESTABLISHED 1892•

221 WEST THIRD STREET, CINCINNATI 2, OHIO



CINCINNATI DUPLEX CHAIN

CINCINNATI Chains Bits and Bars
Used in America's Foremost Mines

Cincinnati Coal Cutting Equipment such as illustrated above is performing with maximum efficiency in an ever increasing number of mines in this country and abroad. Illustrated is a Cincinnati No. 6 Thin Kerf Chain and Cincinnati No. 2353-A Thin Kerf Cutter Bar operating in 26" to 28" coal seam.

OUR BEST
ADVERTISING COMES FROM OUR CUSTOMERS

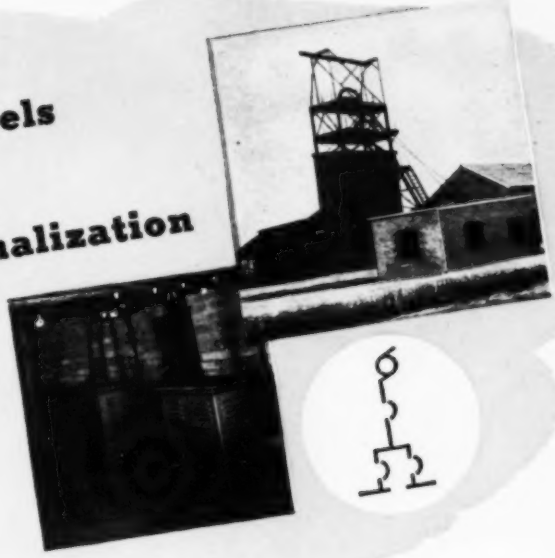
TOP PERFORMANCE of Cincinnati Coal Cutting Equipment year after year in Mine after Mine in this country and abroad has built more new business and more repeat business than anything we might say. We want to take this opportunity, however, to point out that Cincinnati Coal Cutting Equipment is well engineered and ruggedly constructed . . . that it uses less power . . . increases production . . . provides larger cuttings . . . and decreases machine maintenance costs. Summarizing expressions from our customers, the Cincinnati Chain is virtually trouble-free and is popular with management, machine runners and maintenance men.

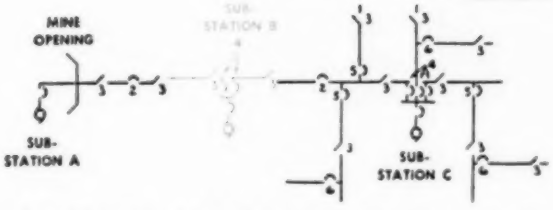
Cincinnati Bars are specially designed to operate under all cutting conditions and will fit all types of cutting machines.

THE CINCINNATI MINE MACHINERY CO.

2983 SPRING GROVE AVENUE • CINCINNATI, OHIO

How to boost production levels through proper sectionalization





APPLY THIS I-T-E SECTIONALIZING PLAN:

KEY

2 I-T-E Type KSC Circuit Breaker — installed in circuit between each two substations.

3 A disconnect switch or protective device placed at not over 1500 foot intervals in every power line.

4 I-T-E Type KSC Circuit Breaker (approx. operating mechanism) used as overload protective device in each circuit feeding a substation.

5 I-T-E Type KSC Circuit Breaker — installed as overcurrent protective device at each main branch circuit.

6 I-T-E Type KSC Circuit Breaker — to protect secondary branch circuits (i.e. a circuit feeding only one local section or territory).

Note: In every case, sufficient feeder and return circuit capacity should be provided so that circuit breaker will be opened by a dead short at the most remote point of the circuit.

When electrical distribution systems are sectionalized with I-T-E Sectionalizing Switchgear, production levels are raised: time lost because of electrical disturbance is kept to a minimum, and safety to personnel and equipment is assured.

In the above application, the heart of protection is the I-T-E Type KSC Automatic Reclosing Circuit Breaker. The only circuit breaker designed especially for the mining industry, the KSC has ample flexibility for meeting changing mine conditions. Completely dependable, it is durable and efficient under the most severe operating demands. Rugged and compact for easy portability, it is also completely metal-enclosed for safety — yet readily accessible for inspections and maintenance.

The I-T-E representative in your locality can give you complete information on the I-T-E Type KSC Automatic Reclosing Circuit Breaker. He is also fully qualified to assist you in the adoption of recommended sectionalizing practices in your mine. Use his services with no obligation.

Be Production-Wise Sectionalize!

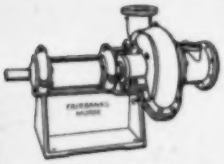
S-E-C-T-I-O-N-A-L-I-Z-I-N-G

SWITCHGEAR

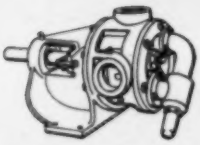
The Leader In Technical Excellence

I-T-E CIRCUIT BREAKER COMPANY, 19th & HAMILTON STREETS, PHILADELPHIA 30, PA.
31 OFFICES IN UNITED STATES • In Canada, EASTERN POWER DEVICES, Ltd., TORONTO

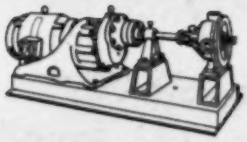
SWITCHGEAR • UNIT SUBSTATIONS • AUTOMATIC RECLOSING CIRCUIT BREAKERS



Paper Stock Pumps



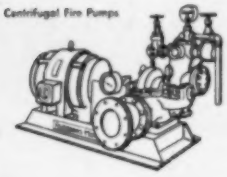
Frame Constructed Rotary Pumps

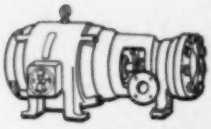


Rotary Pumps with Geared Head Motor Drive

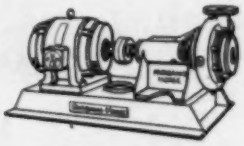
Vertical Propeller Pumps

Centrifugal Fire Pumps

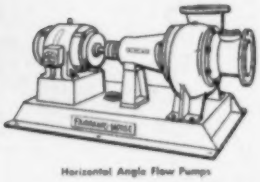




Two-Stage Builtogether Pumps



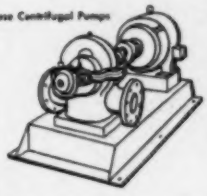
Horizontal Sewage and Trash Pumps

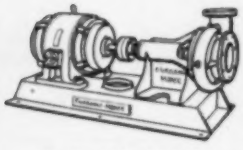


Horizontal Angle Flow Pumps

Vertical Close-Coupled Sewage and Trash Pumps

Split-Case Centrifugal Pumps

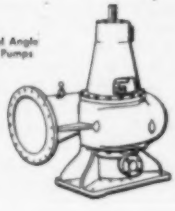


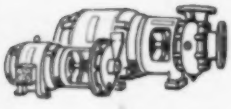


Base-Mounted Centrifugal Pumps

Vertical Sewage and Trash Pumps

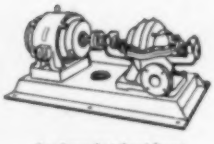
Vertical Angle Flow Pumps



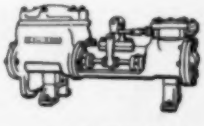


Builtogether Centrifugal Pumps

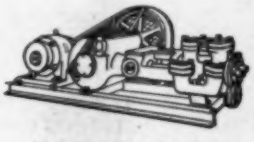
Deep Well Turbine Pumps



Two-Stage Centrifugal Pumps



Duplex Steam Pumps



8 Cover Side-Pot Duplex Power Pumps

for Pumps...

THAT DELIVER

plus performance lasting dependability unsurpassed economy

The Fairbanks-Morse Pump Dealer is your best bet for assistance in pump selection...for reliable service. Fairbanks, Morse & Co., Chicago 5, Ill.

FAIRBANKS-MORSE

A name worth remembering

DIESEL LOCOMOTIVES • DIESEL ENGINES • PUMPS • SCALES
MOTORS • GENERATORS • STOKERS • RAILROAD MOTOR CARS
and STANDPIPES • FARM EQUIPMENT • MAGNETOS

FATE laughs at probabilities

Probably those underground mine timbers are free from decay . . . *probably* the mine's ventilating system is in good working order . . . *probably* the elevator shaft cables are safe . . . but you can never be sure of complete mine safety with "probabilities".

Bituminous Casualty Corporation removes all doubt concerning mine safety with its extensive Safety Engineering Program. Available to Bituminous Workmen's Compensation policyholders, this program helps save lives and reduce the frequency and severity of accidents. It includes regular mine inspections . . . analysis of mine hazards . . . survey recommendations . . . accident prevention activities . . . reduction of operating expenses resulting from accidents . . . and establishment of production efficiency.

Mine owners, operators and workers alike are served by Bituminous Casualty Corporation and its Safety Engineering Program.

BITUMINOUS CASUALTY CORPORATION

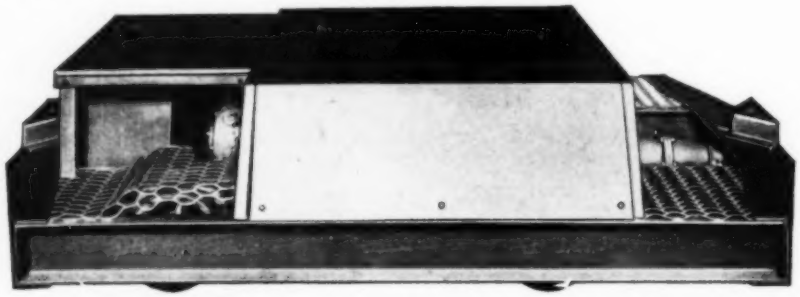
ROCK ISLAND ILLINOIS

SECURITY WITH SERVICE

The Dustmaster Does It Best

Dust first to avoid mine tragedies

It is a long time since two men with shovels aimed their rock dust at the ceiling from a slow-moving car. That procedure, however, in early mines, proved beyond any doubt, the safety of rock-dusting. Today, the Dustmaster thoroughly covers ceiling, sidewalls, crannies and crevices, in a safety operation far beyond the dreams of early miners. It is the last word in scientific rock-dusting for safety.

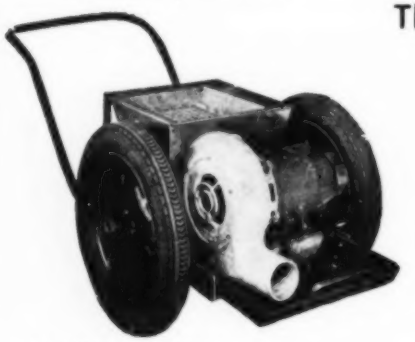


The Dustmaster . . . . trouble free performance . . .

A high pressure machine that can be used in entries and in remote areas to a distance of 500 feet. Compactly and rigidly built for hard service.

Safety devices on all essential units to protect the equipment and operators.

Greatest distributing capacity. Built as low as 25 inches above rail. 250 lbs. of dust per minute through short hose. 125 lbs. per minute through 500 feet of hose. Write for complete descriptive literature.



The Mighty Midget Distributor

Portable, by all means . . .

Equipped with a short hose nozzle and sufficient trailing cable it can be transported to rooms to dust faces, or into remote section, back areas and air courses. In actual performance it has distributed MORE THAN A TON OF DUST PER HOUR during an entire shift including lost time. It can be dragged on its bottom, transported on belt, in coal car, shuttle car, on low truck (we build), cart (as illustrated) or on the cutter bar of a mining machine.

When writing, please use street and zone numbers

Free Demonstration . . .

If you are not familiar with the performance of "Dustmasters," a demonstration of the model will convince you of their efficiency, money-saving possibilities, and safe mine conditions at all times.

American Mine Door Company

2057 DUEBER AVENUE **CANTON 6, OHIO**

All across the country

R & S-engineered coal cleaning plants

SPECIALIZE in SUCCESS!

In every coal producing area you find preparation plants engineered by Roberts and Schaefer Co.—each engineered to solve specific problems, each engineered to produce specific end-products. In general no two plants are alike, but there's one vital element common to them all: **they specialize in success.**

There's no accident about the presence of that specialty. Every plant is successful because it was intended to be, designed to be, built to be.

Pictured here are two coal cleaning plants in Western Kentucky—different in design and construction because each represented an individual problem; alike in their R and S pattern of success.

Consider your own plant—is it modern? economical? equal to the growing demand for coal better prepared for particular uses? secure against the increasing pressure of competition?

You'll find it worth while to discuss these fundamental questions with R and S engineers.

They can help you determine your potential profit, and show how R and S experience can help you to get it.

As a practical first step, write us.

W. G. Duncan Coal Co., Skibo Mine, Greenville, Kentucky

West Kentucky Coal Co., East Diamond Mine, Madisonville, Ky.

ROBERTS and SCHAEFER CO.

130 North Wells Street, Chicago 6, Ill.

2801 Broadway Ave.
PITTSBURGH 16, PA.

P.O. Box 570
HUNTINGTON 10, W. VA.

THESE INFORMATIVE BULLETINS TELL THE HOW AND WHY OF MODERN, AUTOMATIC R&S OPERATING EQUIPMENT. SEND FOR YOURS . . . TODAY

For dry cleaning fine coal R & S SUPER-AIRFLOW Bulletin No. 167

For washing coarse coal R & S HYDRO-SEPARATOR Bulletin No. 171

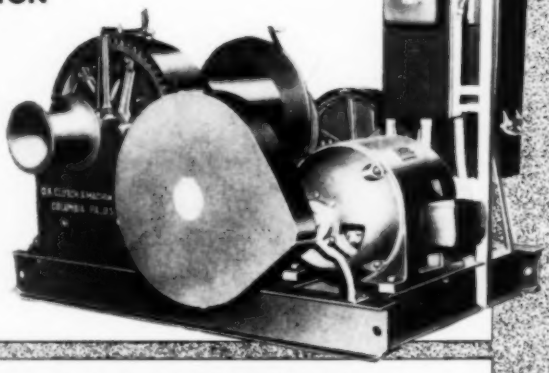
For washing fine coal R & S HYDROTATOR Bulletin No. 166

Four O.K. ELECTRIC HOISTS Replace Two Locomotives - - -

WILL PULL 10 TO 110 TON LOADED CARS

Equipped with a special gear drive that increases pulling power and decreases speed to a rate of, as little as, 16 ft. per minute, the F-50 is another outstanding O.K. development. So efficient and economical, that it has been estimated to pay for itself in one year of operation.

O.K. hoists are built to fit your specifications. We will gladly discuss any special problem—or supply you with information on the complete line of O.K. hoists, compressors or the portable elevator.



O.K. CLUTCH & MACHINERY CO.

Columbia, Pennsylvania, U. S. A.

OUR PRODUCTS HAVE BEEN GIVING SATISFACTION SINCE 1903

Parmanco

MECHANICAL FEED HORIZONTAL DRILL. WITH TRACTION DRIVE

Ten years of field test has proven that our power-feed design of direct transmission and worm gearing with two-speed control will not only cut shot hole drilling time in half but also eliminate costly maintenance delays. V-belt drive to the power-feed with an additional ample clutch in that assembly gives absolute control of a drilling speed of two to three feet per minute with a retrieving speed of twenty-four feet per minute.

The Parmanco Horizontal is adapted to all forms of high-wall drilling, will handle a six-inch auger up to a distance of sixty feet or more and, by use of our patented augers with interrupted flights and secondary cutters, will drill an absolutely clean hole with a minimum of torque. It permits the drilling of a controlled-angle hole which makes possible a great saving of explosives through the cantilever effect of this controlled-angle drilled hole.

EFFICIENT STRIPPING STARTS WITH EFFICIENT DRILLING

PARIS MANUFACTURING COMPANY
PARIS, ILLINOIS

The all-electric ... self-propelled

CP One-Man Permissible Tramdrill for trackless mines

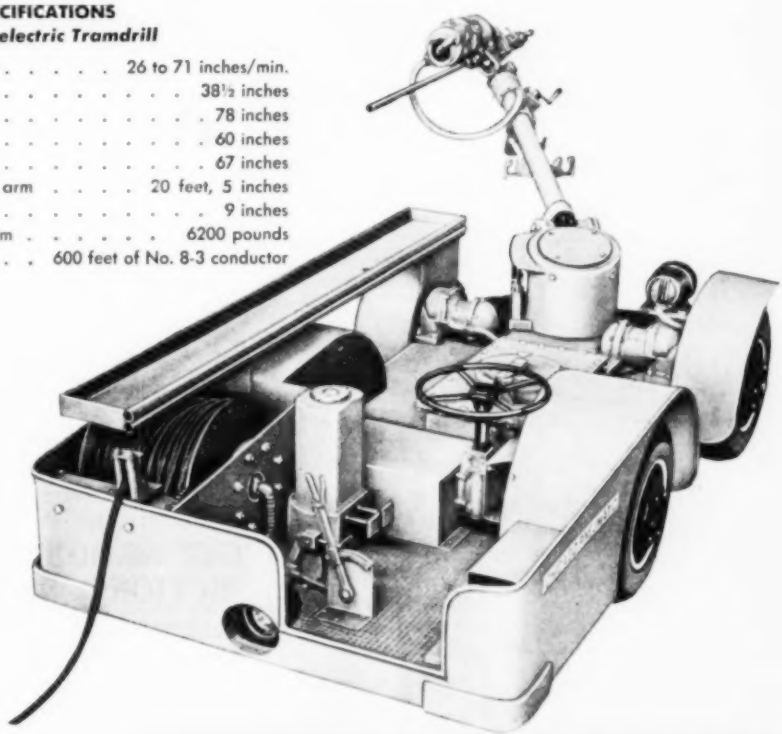
Drilling, tramming, and cable reel — all are powered by electric motors on the CP One-Man Permissible Tramdrill. Mobile . . . easy to operate . . . it drills shot holes in coal up to 4½" in diameter . . . at any angle . . . within four inches of roof or bottom. It also drills in rock, except sandstone.

Definitely a one-man drill, the electrically powered CP Drill Arm has all controls at the end of the arm, within easy reach of operator. Safety interlocking switch cuts off electric drill motors while tramming; prevents tramming while drilling.

CP Tramdrill complies with all requirements of U. S. Bureau of Mines and carries Bureau's permissible name plate No. 2-641 for operation on 250-volt D.C. power; No. 2-641A on 500-volt D.C.

SPECIFICATIONS
TDS all-electric Tramdrill

Drilling speed, full load	26 to 71 inches/min.
Overall height	38½ inches
Overall width	78 inches
Wheel base	60 inches
Wheel gauge	67 inches
Overall length with 7-foot arm	20 feet, 5 inches
Ground clearance	9 inches
Weight, with one 7-foot arm	6200 pounds
Cable reel capacity	600 feet of No. 8-3 conductor



Write for full information on this new CP Tramdrill

CHICAGO PNEUMATIC TOOL COMPANY
General Offices: 8 East 44th Street, New York 17, N. Y.

HAND-HELD AND POST-MOUNTED ELECTRIC COAL DRILLS • ELECTRIC DRILL ARMS
ELECTRIC TOOLS • PNEUMATIC TOOLS • AIR COMPRESSORS • ROCK DRILLS

What Are The Specifications?

Who Makes It?

Where Can I Buy It?

. . . Here's the Mining Man's

ANSWER BOOK

The MINING CATALOGS offer a bonanza of buying information to all men responsible for selection and purchase of the machinery, equipment and supplies required for the operation and maintenance of bituminous and anthracite coal mines all over the world.

Here you can find—*in an easy and instantly accessible form*—up-to-the-minute descriptions, specifications and illustrations of the products of leading manufacturers which are *specifically* applicable to all phases of coal mining activity . . . Here you get the FACTS—edited and arranged for maximum convenience—covering the data you need to make fast, intelligent selections of the equipment and supplies commonly used in the following coal mining and processing operations:

Transport of Men and Materials · Loading and Conveying of Product · Crushing and Sorting · Mine Drainage · Lighting and Ventilation · Weighing and Storage · Portable Power Generation · Mining Equipment Maintenance · Engineering and Administrative Functions.

***MORE** product data . . . and **FASTER** than from any other source!*

This thirty-fourth annual edition of MINING CATALOGS contains:

1. Over 500 pages of descriptions, specifications and illustrations of machinery, equipment and supplies essential to the mining and preparation of coal in:

   1. Anthracite Mines (Deep and Strip) Collieries and Breaker Plants.

   2. Bituminous Mines (Deep and Strip) Collieries, Preparation Plants and Tipples.

2. A comprehensive Classified Product Directory designed to cover all known manufacturers recognized as regular sources of supply for all phases of the Mining Industry, is included as a bound-in section of each volume of the MINING CATALOGS.

3. Company names of manufacturers who have catalogs pre-filed in the MINING CATALOGS are listed in the directory in prominent boldface type, with a reference to the pages on which their product information may be found.

If YOU are not now receiving the MINING CATALOGS

and are responsible for specifying or buying machinery, equipment or supplies for a mining operation, send a request on your company letterhead giving your full name and title. We will send you the current edition.

McGRAW-HILL CATALOG SERVICE

330 West 42nd St., New York 18, N.Y.

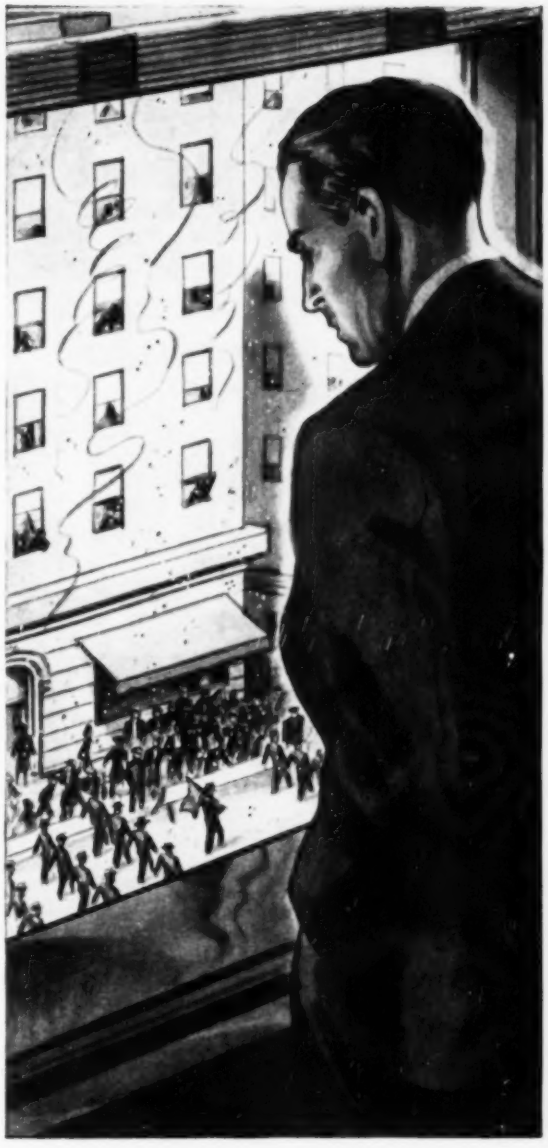
MEMO TO PRESIDENTS WHO WATCHED THE BAND GO BY!

HERE'S ONE parade that isn't "all over but the shouting" after the band has passed. It's the Payroll Savings Plan for the regular purchase of U. S. Security Bonds by employees.

Though the formal spring campaign to sell Bonds is over, any company can still move forward with the parade. Right now thousands of companies are putting *additional push* behind their Payroll Savings Plans. Managements of many companies that have not yet participated are *now installing* the Plan.

It's a "look-ahead" plan, that benefits employee, company, and nation. Every $3 invested in Bonds pay $4 at maturity. Personnel records in the plants with active P. S. P. programs show improved employee attitudes—evidenced by less absenteeism and fewer accidents—as the individual's sense of security grows with Bond purchases. And every Security Bond dollar built up in the Treasury retires a dollar of the national debt that is potentially inflationary. It means less bidding-up of prices. Moreover, Bond buyers are better citizens because they have a tangible stake in the nation's future.

It's just as easy to take action now as when the campaign was at its height. Just call your Treasury Department's State Director, Savings Bonds Division, and ask for the material that helps to get a Payroll Plan started or to keep it rolling.



The Treasury Department acknowledges with appreciation the publication of this message by

COAL AGE

This is an official U. S. Treasury advertisement prepared under the auspices of the Treasury Department and the Advertising Council.

COMPLETE BELT CONVEYORS

BELTING • IDLERS • HEAVY DUTY PAN FEEDERS

Immediate Delivery — WRITE FOR LITERATURE — *Reduced Prices*

FRANK A. KREMSER AND SONS, INC.
3435-45 NORTH 5th STREET, PHILADELPHIA 40, PENNA.
At Fifth Street Where The World Goes By On The Pennsylvania Railroad • REgent 9-7272 " 9-7524

"We look into the Earth"

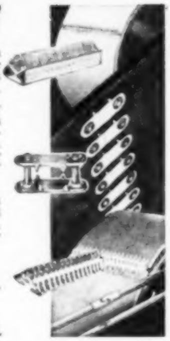
CORE DRILLING
—anywhere!

PENNSYLVANIA Drilling CO.

DRILLING CONTRACTORS

1205 Chartiers Ave. **PITTSBURGH, PA.** WAlnut 5816

ARMSTRONG-BRAY



WIREGRIP Belt Hooks come with extra (patented) blue aligning cards—that assure perfect alignment of hooks—less hook loss and a better job when applied. 6 sizes.

PLATEGRIP Fasteners for . . . Conveyor Belts. Make strong dust-tight joints in belts, of any width. Spread tension uniformly. Allow natural troughing of belt. Operate smoothly over flat, crowned or take-up pulleys. Sizes for belts from ¼" to 1½" thick. Easily applied.

STEELGRIP Flexible Lacing, applied with a hammer, clinches over and protects end of belt. Makes strong, flexible joints. Boxed with 2-piece hinged rocker pins or in long lengths.

ARMSTRONG-BRAY & CO.
"The Belt Lacing People"
5340 Northwest Hy. Chicago, Ill.

SEARCHLIGHT SECTION

EMPLOYMENT • BUSINESS • OPPORTUNITIES • EQUIPMENT—USED or RELEASED

UNDISPLAYED RATE:
Not available for equipment advertising
90c a line. Minimum 4 lines. To figure advance payment count 5 average words as a line. (See ¶ on Box Numbers.)
POSITIONS WANTED (full or part-time individual salaried employment only), ½ the above rates.
PROPOSALS, 90 cents a line an insertion.

INFORMATION:
BOX NUMBERS in care of any of our New York, Chicago or San Francisco offices count as one additional line in undisplayed ads.
DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED RATE
The advertising rate is $7.25 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

NEW ADVERTISEMENTS received by 10 A.M. February 17th will appear in the March issue subject to limitations of space available.

NOTICE

McKINLAY MINING and LOADING MACHINE COMPANY, Incorporated, 201 Bates Bldg., Owensboro, Kentucky, has taken over all assets including patents, contract rights, etc., of the McKinlay Mining and Loading Machine Company (Colorado) and of the late Edward S. McKinlay, Belle B. McKinlay, Peter C. McKinlay, Anna R. O'Donnell, their heirs and assigns, in so far as said assets pertain to the McKinlay activities including the so-called entry and tunnel driving machines for coal mines and other operations.

Correpondence and inquiries are solicited which will receive prompt attention. The "McKinlay" is a very simple but proved continuous coal mining and loading machine of many (but poorly exploited) years standing. It eliminates all drilling and blasting without producing an excessive amount of fines and with minimum horsepower requirements. Accessory equipment and services to be offered with machines make same attractive for reducing face mining costs as well as equipment investment.

McKINLAY MINING AND LOADING MACHINE CO., INC.
201-204 BATES BUILDING — OWENSBORO, KENTUCKY

FOR LEASE: 174 ACRES
LEVEL LAND, PARTLY DRILLED
OHIO STRIP COAL LAND
Jackson Township, Mahoning County
[Thirteen to forty feet overburden. No hard rock. [illegible] to [illegible] feet good coal. On hard surface roads close to Railroad and within 11 miles of Youngstown. Give financial and other qualifications with inquiry.]
Owner: Donald Kirk, Axis, Alabama. Mobile 3-7030

ANNOUNCEMENT

Effective as of January 1, 1949, the corporate name of Salmon & Cowin, Inc., Mining Engineers and Contractors, was changed to Cowin & Company, Inc., Mining Engineers and Contractors.
There will be no change in policy, personnel or service.

PERCY G. COWIN, PRESIDENT
930 Second Avenue, North — Birmingham, Ala.
Telephone 3-4271-2

LEEK FOUNDRY & MACHINE CORP.
DAYTON — PENNSYLVANIA

Gray Iron — Brass — Aluminum Castings
Mine Cars Built to Order
Machine Work — Welding — Woodworking

EMPLOYMENT . . . EQUIPMENT . . . BUSINESS
OPPORTUNITIES
Whatever your need—
think "SEARCHLIGHT" FIRST

1—100-KW. West, 6-phase, pedestal type Rotary Converter outfit comp., 250-volt D.C. with 2—36-2.3-KVA. West. Transformers, 440 volt primary and comp. switchboard equipment (rebuilt)
1—75-KW. West. M-G set complete, 250 volt D.C., 2300 or 4000 volt A.C. Sync.
3—100-KW. General Motors Diesel Engine-Gen. sets, 250 volt D.C. (like new)
3—70-HP. Continental Red-Seal gasoline or natural gas engines, equipped with elec. starter, generator and Twin Disc clutch (new)
1—100-HP. Buda Diesel Eng. (elec. start.)
1—4'x8' Allis-Chalmers double deck vibrating screen
1—Three track Morrow high speed shaker screen
1—35-B Jeffrey cutting machine, 7' bar & Cincinnati duplex chain, 250 V.
1—7-B Sullivan cutting machine #12963, with 8' Bowdill bar & chain (like new)
1—8-HP. Joy loading machine with large gathering head and wide cast, 250 V.
1—PL31-5E Joy elevator #E6766, 250 Volt, (like new)
1—12-AA Goodman cutting machine with new 8' bar and chain, tr. ck and pony truck, 44" ga., 250 V.
1—4-Ton Jeffrey MH-96 Locomotive with cable reel, 44" ga., 250 V., will change to 42 or 36" ga.
60—Tons 25 lb. mine rail and 2000 25# steel ties, 44" ga.
16—25# Switches with pitelled throws complete
3—200 KVA. G.E. Transformers, 7620/13200 to 2300 volt
2—375-KVA. G.E. Transformers, 2300 to 115/230 volt
28—Sanford-Day drop bottom mine cars, 36" ga.
8—Sanford-Day all steel side dump rock cars, 36" ga.
12—300-Amp. Wilson Hornet welding machines, 220/440 volt, 3-ph., 60-cyc. motors
2500—Ft. 6" galvanized invasion pipe
1—26" Poedick drill press with direct motor drive
1—32" Cincinnati back geared shaper with direct motor drive

Many other items of good new and used machinery available at all times. Your inquiries appreciated.

R. C. Jones & Company
Box 386 **Phone 610**
Ashland, Kentucky

FOR SALE
AT BARGAIN PRICES

LOADING MACHINES

Three (3) 12-BU-7G Joy Jr. Loading Machines, 220/440V, A. C. Serial Numbers 3441, 3442, and 3395. First two new in 1948 and Serial 3395 delivered Sept., 1948—New. Used one month.

MINING MACHINES

One (1) 35B Jeffrey Mining Machine, Serial #21978, 220/440V, A. C.

One (1) 35-2B Jeffrey Mining Machine, Serial #21978, 220/440V, A. C.

Eight (8) 11-B Sullivan Short Wall Mining Machines, 220/440V, A. C., Serial numbers 11808, 11809, 11810, 11811, 11825, 11826, 14984, 14985.

CONVEYORS

Seven (7) La-Del Model FA Flight Room Conveyors, complete, 300 ft. ea.

Four (4) La-Del Model FF Flight Face Conveyors, complete, 50 ft. ea.

The Serial Numbers of FA Flight Room Conveyors, 2251, 2256, 2235, 2236, 1459, 1467, 1462.

442 Intermediate Sections, 20" wide, complete with 2¾" Diameter Idlers.

One (1) Model UN-17 La-Del Shaker Conveyor, complete, 350 ft. long.

Two (2) Model UN-17 La-Del Shaker Conveyors, complete, Serial numbers SC1092 and SC1093, 300 ft.

Two (2) Model UN-17 La-Del Shaker Conveyors, complete, Serial numbers SC1246 and SC1247.

Three (3) Goodman Duckbills.

BELTING

1495 ft. Almost New 26" Homocord Belt made by Manhattan Rubber Co. (400 ft., new and still on roll).

DRILLS

Ten (10) #572 440V, A. C. Little Giant Coal Drills.

BELT CONVEYORS

One (1) Model MTH-30" Belt Conveyor, complete, consisting of drive unit equipped with 40-20 HP, 440V, A. C. Open Type Motor and 40 HP controller sprockets and drive chain, adapter for 26" wide intermediate sections, takeup unit, pull jack.

Two (2) Model MTH-26" Belt Conveyors, complete.

CIRCUIT BREAKERS

One Air Circuit Breaker K-6565968A101; Type AA-1-15; 225 Amp., Frame size 600 Volt; 60 Cycles; 3-poles; Man. Oper.; 150 amps. enclosed (New—received December, 1948).

Two used Air Circuit Breakers, same as above.

MISCELLANEOUS

Cable—2,500 ft., 2/0, 4-conductor, 60V, 1040 ft. 8 Con. Comb. Anhydrex SA & Neoprene Jacketed Underground Cable, 600V., 3-Conductor #6—2 Ground Wire #10 (New and on reel).

1810 ft. 6 Cond. Comb. Shielded Anhydrex SA & Neoprene Jacketed Underground Cable, 2500 Volt Neutral Grounded 3-Cond #1—7 Strands and 2 Ground Wires #2—7 Strands—(New and on Reel).

CLOVER DARBY COAL COMPANY, INC.

Closplint, Harlan County, Kentucky **PHONE: Evarts, Ky. 227**

Surplus Equipment for Sale

1—14 BU Joy loader—type 3PE #4511—42 gauge—34" clearance.
1—Joy shuttle car—type 32-E-7 machine E2 #1453
1—Joy cat truck—type T253 machine #MT44.
1—Elevator—type PL 115E machine #EC442.
1—G 200 Chicago Pneumatic wagon drill complete with drill rods for 3" hole.
1—Jeffrey arc wall machine.

Address:
The Hocking Valley Mining Co.
Nelsonville, Ohio
Phone 230

STEEL
for All Purposes

IMMEDIATE DELIVERY

Warehouse and Fabricating Facilities

Write — Wire — Phone

LONG ISLAND BEAM CO.
39-21 21st St. Long Island City 1, N. Y.
Stillwell 6-5900-1-2-3

FOR SALE — DIESELS
Immediate Delivery

1—200 KW DC Buckeye Diesel Generator Set
1—150 KW DC Atlas Imperial Diesel Generator Set
2—125 DC Buckeye Diesel Generator Sets
1—150 HP Buckeye Diesel only
2—112½ HP Buckeye Diesels only
2—300 KW AC Buckeye Diesel Generator Sets
1—200 KW AC Buckeye Diesel Generator Set
1—PD40 International Power Unit
2—100 KW AC Buckeye Diesel Generator Sets

What size engine do you need?

WRITE WIRE PHONE

ROBERT L. NEISWANDER
Phone 4-2867
Lima, Ohio P. O. Box 554

VIKING
Oil Treating Unit

Dual system, Model 300 D.P.U. Automatic, electric. Will handle extra heavy oils—In excellent shape—owned by operator.

FS 7582 COAL AGE
520 N. Michigan Ave., Chicago 11, Ill.

FOR SALE

One—Type 82A B.A. Goodman Slabbing Machine, Serial No. 827. This is a brand new machine that has cut only six places and was replaced by rubber tired mobile machines. This machine has permissible motors, but does not have a permissible starting box or resistance. Located at the Mary Alice mine of the Elcomb Coal Co. Mary Alice, Ky., Harlan County.

FOR SALE

Page 625S Diesel Walking Dragline, 140' boom, 9 yd. capacity, excellent condition. Being sold due to completion stripping this area. Located Northern West Virginia. Price $150,000.00 (includes $10,000.00 worth of parts, one 9 Yd. and one 8 Yd. bucket) delivered to R.R. spur.

Marion 492 electric 5 yd. coal-loading shovel, 32' boom, 22'3" sticks, equipped with 5 yd. welded coal dipper. Serial 8789, new Feb. 1948, can be seen operating at New Lexington, Ohio. Excellent condition. Price, $80,000.00 f.o.b. Cars.

SUNNYHILL COAL COMPANY
P. O. Box 7931
Pittsburgh 16, Pa.
Phone, Lehigh 1000

BARGAINS IN MINING EQUIPMENT

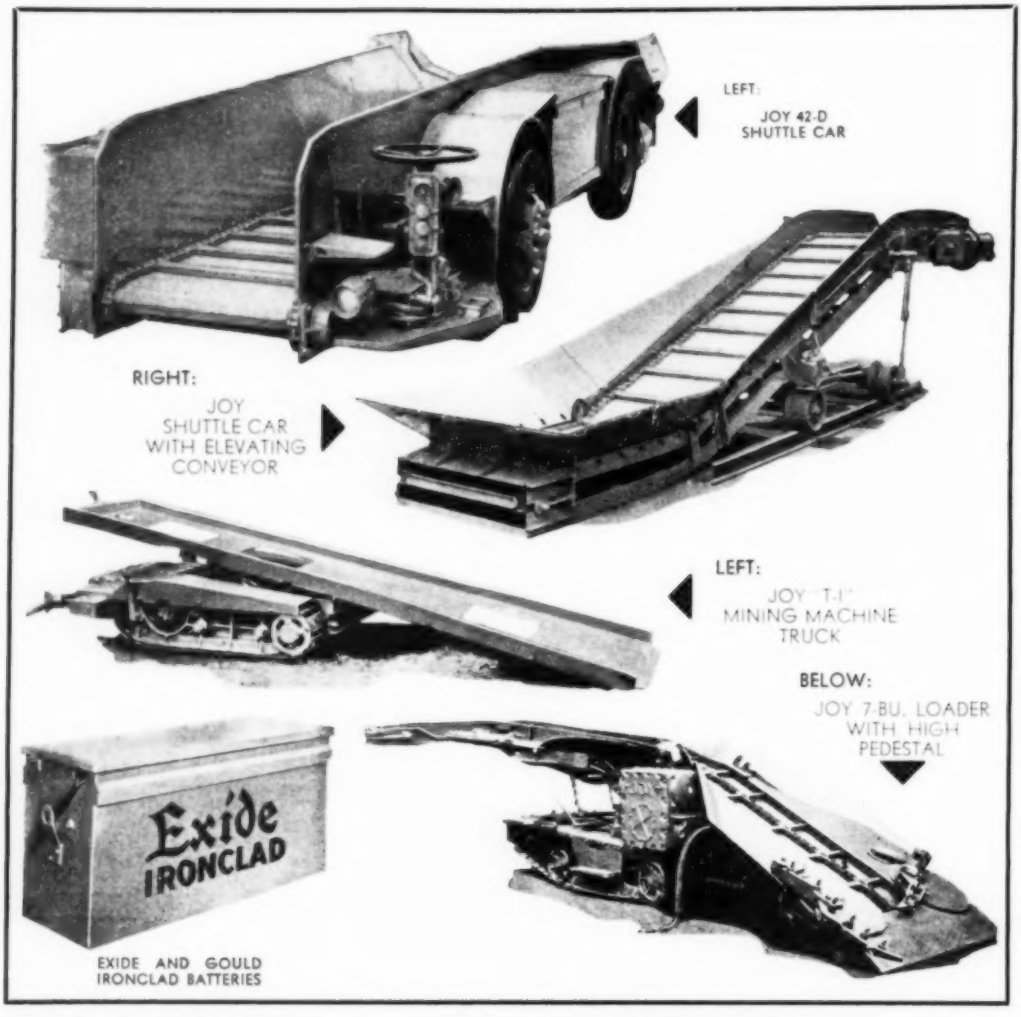
100 KW. diesel gen. set.
100 kw MG set.
450 hp mine hoist S.R. 2,200 volts, motor and control.
300 hp mine hoist.
150 hp hoist with or without motor.
150 hoist with 550 volts motor.
Westinghouse bat. steel 6 ton, 42" gauge locomotive.
90-C ball type, with extra armature.
2 Jeffrey 4 ton locomotives.
Wire bar steel, same as above, with horiz. reel.
CR 2 ac coal cutter with 36" gauge trucks and cable.
2 phase, 220 volts, 6½ ft. bar.
Several 24 B Jeffrey machines, both ac and dc.
2—8 AB ac Goodman coal cutters.
2—8G1 ac Goodman coal cutters.
Bargains in dc motors 250 volts from 3 to 75 hp.
Bargains in ac motors. Any kind or size.
Also few dc starters, 3 to 75 hp.
1,000 amp. auto. reclosing breaker.
20 hp ac pump on base, 3" discharge, dc motor 1750 rpm.
60 hp ac motor centrif. pump, 220 ft. hd., 750 GPM.
22 hp GE motor and pump on base, 3" discharge.
50 hp ac motor centrifugal pump, 350 GPM, 350 ft. head.
112 AA B Goodman coal cutter, 5½ ft. bar.
2—112 G3 ac Goodman coal cutters.
2—50 ton coal washer flaps.
2—5 hp Joyce hoists with ac or dc motor.
2—572 dc CP coal drills.
5—572 ac coal drills.
1—8G1 Goodman machine truck with reel, 36" ga.
1000 ft. bare copper 3/8" signal cord. Size #4.
Complete coal mine with washer all ready to operate.

EMERSON ELECTRIC COMPANY
711 North 9th Street Birmingham 4, Alabama

ACT NOW-FORESTALL

This equipment is *NEW* or nearly new.

***ACT NOW!* Don't wait to modernize your production facilities. This equipment is available *NOW*. It is PRICED right. It IS right. And you get *IMMEDIATE DELIVERY*.**



THE COLUMBINE MINE EQUIPMENT CO., INC.

FLAT IRON BUILDING, 1669 BROADWAY **DENVER 2, COLORADO**

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N. Y.

SEE PAGE 225 FOR APPROXIMATE SUMMARY OF HARD-TO-GET OFFERINGS

POSSIBLE PRICE INCREASES

This equipment is *NEW* or nearly new. All of our Equipment has been completely over-hauled and Parts replaced with NEW GENUINE FACTORY REPLACEMENTS. Every Item is guaranteed to be as represented, either NEW or nearly new and carries the same guarantee the original manufacturer warrants. We welcome your inspection.

***ACT NOW!* Don't wait to modernize your production facilities. This equipment is available NOW. It is PRICED right. It IS right. And you get *IMMEDIATE DELIVERY*.**

Here are some of the HARD-TO-GET OFFERINGS

(While They Last)

1—10 ton Jeffrey locomotive 36" ga. (trolley type), 250 v. D.C.

3 ton, 4 ton, 6 ton, 8 ton, 10 ton, 15 ton, and 20 ton G. E., Westinghouse, Jeffrey and Goodman locomotives.

COAL MINING MACHINES—29 L-E "Arcwall" Jeffrey mining machines mounted on Joy electrically driven caterpillar trucks.

Goodman Shortwall No. 112 mining machines.

Goodman 36" gauge TRUCKS, Type "M."

MINING MACHINE TRUCKS—Joy "T-1."

MOTOR GENERATOR SETS—1 set 225 H.P. connected to Ridgeway 150 K.W. generators, with panelboards, A.C. and D.C. meters and transformers complete. 1 set 300 H.P. connected to Ridgeway generators, 200 K.W., complete with panelboards, A.C. and D.C. meters and transformers. And others.

BATTERY CHARGING UNITS—Joy, Westinghouse, Hobart Bros Co., Electric Products Co.

MOTORS—A.C. and D.C., all types, 1 H.P. to 300 H.P., starting compensators and switches.

TRANSFORMERS—General Electric, Westinghouse, 7½ KVA, 37½ KVA and 150 KVA.

BOX CAR LOADERS—Ottumwa-Manerre.

PUMPS—Geared and centrifugal—motor and belt driven—Gould, Demming and Myers.

FANS—American Blower, Sturdevant.

TIPPLE—3 track tipple consisting picking screens, grizzlies, car retarders, end dump, belt conveyors, elevator bucket conveyors, box car loaders complete.

VIBRATOR SCREENS—Ty-Rock Tyler F-600 2 surface 5'x10' Screen, full floating.

SHAKER SCREENS—"Marcus" shaker screens.

CONVEYORS—Flight conveyors, elevator conveyors.

COAL CRUSHERS.

RAILS—150 tons 60 lb., 150 tons 65 lb.

SPIKES, bolts, tie plates, frogs, switches, switch throws.

COPPER trolley wire—2 0, figure 8 and 4 0 round.

TROLLEY HARDWARE—Hangers, clamps, frogs, switches, roof hangers.

TRANSMISSION WIRE—Single conductor, 2 conductor, 3 conductor—Neoprene, glass, rubber insulated 2 0 to 500,000 CM. New.

JOY 7-BU. LOADERS—Caterpillar mounted with high pedestal.

SHUTTLE CARS—Joy 42D storage battery.

ELEVATOR CONVEYORS—Joy.

AIR COMPRESSORS.

MACHINE SHOP—Complete.

ELECTRIC SHOP—Complete.

CARDOX PLANT—Complete.

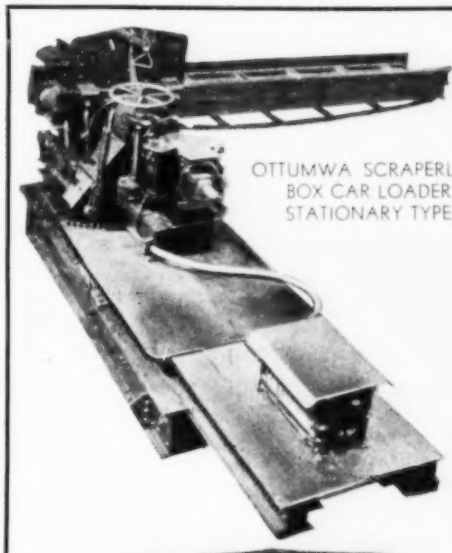
BATTERIES—Exide and Gould Ironclad, 24 cells.

$150,000.00 WORTH of new parts, bearings, gears, bolts, nuts and screws for Joy, Jeffrey, Goodman, Ottumwa, Manerre, General Electric, Westinghouse, Demming, and other popular manufacturers' equipment.

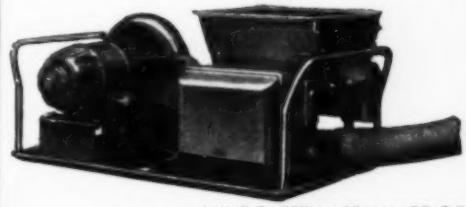
ROTARY CAR DUMPER for 36" gauge Cars With Automatic Control.

HOISTS—1 Double Drum Conical Hoist—Denver Engineering Works—300 HP., Silent Chain Drive. Complete With All Panelboards, Transformers and Controllers and Numerous Others.

ALSO THOUSANDS OF ITEMS TOO NUMEROUS TO MENTION



OTTUMWA SCRAPERLINE BOX CAR LOADER STATIONARY TYPE



MINE SAFETY APPLIANCE CO. ROCK DUSTER

GOODMAN TYPE 112 SHORTWALL COAL CUTTER

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

SEARCHLIGHT SECTION

250-VOLT BALL-BEARING LOCOMOTIVES

3—6-ton General Electric, Type HM-821
3—6-ton General Electric, Type HM-801
2—6-ton Westinghouse, Type 905C
4—6-ton Goodman, Type 33A14T
3—8-ton General Electric, Type HM-819
2—8-ton General Electric, Type HM-807

The above Locomotives are from 36" to 48" gauge. All are equipped with CY-21 motor-driven gathering reels and 500' of practically new cable. All are rebuilt. Can make immediate shipment.

DC CUTTING MACHINES

3—112AA Universal Goodman, on tip-turn trucks
2—7-AU Universal Sullivan Machines, late type, 42" gauge
4—12AA Goodman Standard
4—29L Jeffrey Top Cutters
4—29L Jeffrey Bottom Cutters
5—24L Jeffrey
1—29C Jeffrey Permissible Top Cutter

AC CUTTING MACHINES

3—Goodman Universal 112CG3A, on self-propelled trucks, reel and cable, 7½' cutter bar
1—35-B Jeffrey
8—11B Sullivan Shortwalls

250-VOLT DC LOADING MACHINES AND SHUTTLE CARS

2—14-BU Joy, Type 14BUPE
3—42E13 Shuttle Cars
4—7-BU Joys
4—11-BU Joys
5—No. 5 Myers Whaley
3—L-400 Jeffreys
2—BH-460 Goodmans

AC LOADING MACHINES

1—8-BU Joy, on cats.
3—7-BU Joy, on cats.
3—12-BU Joy

CONVEYORS AND BELTING

7—LaDel FA Flight Room Conveyors, 300' each
4—LaDel FF Flight Face Conveyors, 50' each
447—Intermediate Sections, 26" wide with 2½" diameter idlers
1—LaDel U-17 Shaker Conveyor, 350' long
4—LaDel UN-17 Shaker Conveyors, 300' long
2—Goodman Duckbills
1—26" Homocord Belt—7493' long
1—Model MTB—30" Belt Conveyor, complete
2—Model MTB—26" Belt Conveyors, complete

MISCELLANEOUS

Mail or phone in your inquiries regarding Hoists, Substations, Mine Cars, Tipples and any other hard-to-find equipment.

Frank J. Wolfe

We specialize in buying complete mines that are going out of business or from receivers in bankruptcy, administrators of estates, etc.

COAL MINE EQUIPMENT SALES COMPANY

306-307 BEASLEY BUILDING L.D. PHONE 34 TERRE HAUTE, INDIANA

FOR SALE — FIRST QUALITY USED LIGHT RAILS WITH SPLICE BARS FOR IMMEDIATE SHIPMENT

300 Tons	20 lb.
50 Tons	35 lb.
150 Tons	40 lb.
1500 Tons	56 lb.

Also heavier Sections First-quality Relaying Rails, Splice Bars, Switch Material, Tie Plates, New Spikes and Bolts located at Convenient Points throughout the Country.

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SWITCH TO BUMPER

SPECIAL OFFERING
We Offer 50,000 Good Used Creosoted Cross Ties
Immediate Shipment

MORRISON RAILWAY SUPPLY CORP.

KANO BLDG. BUFFALO 3, N.Y. — EMPIRE BLDG. BIRMINGHAM 3, ALA.

RELAYING RAIL
All Sizes
Track Accessories
LEFTON INDUSTRIAL CORP.
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RAIL FOR SALE

100 tons NEW 40# ASCE
10000 tons 16 to 110# Relay

TIE PLATES

1000000 for 60 to 110# Rail

COMMERCIAL METALS CO.

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RAILS — CARS

All sections of rails and good serviceable second hand cars, all gauges, also spikes, bolts, frogs, switches and ties.

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RELAYING RAIL

TRACK ACCESSORIES
MIDWEST STEEL CORP.
Gen. Off.: CHARLESTON 21, W. VA.
Warehouses
CHARLESTON, W.VA.
KNOXVILLE, TENN. • PORTSMOUTH, VA.

FOR SALE

Carload of 60# rail and switches.

MID-CONTINENT COAL & COKE CO.
Sturgis, Kentucky

FOR SALE

One Lima 802 Shovel with 31' 6" boom, 27' dipper sticks, 1¾ yard dipper. Also Dragline attachments, including 70' boom and 2¼ yard Page Bucket. Good condition. Also a good inventory of repair parts and cables for same.

WRITE BOX 216
NEW LEXINGTON, OHIO

TRANSFORMERS CIRCUIT BREAKERS

NEW — REBUILT — RENTALS

1 H.P. to 2500 H.P. motors in stock
D.C. A.C., 25-50-60 Cycle

ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.

CASH FOR YOUR SURPLUS

"IN STOCK" USED D.C. MOTORS

7½ h.p. G.E. 230 v—450/1350 r.p.m. $160.
7½ h.p. G.E. 1 v—600/1800 r.p.m. $150.
7½ h.p. G.E. 230 v—1150 r.p.m. $95.
5 h.p. C-W Vertical, 230 v—960 r.p.m. $115.
5 h.p. G.E. 230 v—450/1800 r.p.m. $120.
3 hp. West. 220 v—825 r.p.m. $78.
3 h.p. R & M 220 v—1600 r.p.m. $45.
3 h.p. G.E. 220 v—1700 r.p.m. $45.
2½ h.p. G.E. 230 v—520/1560 r.p.m. $80.
1 h.p. G.E. 230 v—525/2100 r.p.m. $65.
1 h.p. G.E. 230 v—1150 r.p.m. $35.

FALK MACHINERY COMPANY
18 Ward St., Rochester, N. Y.
Main 6347-48

Northern 1250 HP diesel-elec. generating units. Power Plant, steam-elec., 1500 KW, complete. Shovels Draglines, 1¼, 1½, 2½, 3, 5 yd. Manitowoc 4500, 5 yd. diesel dragline, on cats. Whitcomb 7-ton gas locomotive, 36" ga., rebuilt. Porter, Vulcan 18-ton steam locos, 56" ga. Locomotives, gas and steam, 5 to 52 tons. B Erie 2-1.3 yd. diesel front att., 52B-55B.

H. Y. SMITH CO., 820 N. B'way, Milw. 2, Wis.

FOR SALE: 1—150 KW Ridgeway 275 volt, 900 RPM generator driven by Ridgeway 225 HP, 2,200 volt synchronous motor, mounted on common base. AC 16" Panels and ITE Circuit Breaker included.

FS 7773, Coal Age
330 W. 42nd Street, New York 18, N. Y.

COAL MINE EQUIPMENT FULLY RECONDITIONED

AIR COMPRESSORS
1—8⅜ x 4¾ x 5 Pneumatic, 277 cu. ft. displacement. V-belted to a D-4400 Caterpillar Diesel Engine—Semi-portable.

BELT CONVEYORS
1—24", 15' Long, with Ding's Pulley.
1—30", 30' Long, with 2 H.P. Gearhead Motor. New belt.
1—30", 70' Long, with driving mechanism.

FLIGHT CONVEYORS
1—8" Flight Conveyor—65' Long.
1—10" Flight Conveyor—30' Long.
2—24" Flight Conveyors—50' Long.
1—24" Flight Conveyor—85' Long.
1—30" Flight Conveyor—150' Long.

GENERATORS—DIESEL
3—D-13000 Caterpillar Diesel Generators, 75 KW, 440 Volts, A.C.
1—D-4400 Caterpillar. V-belted to 30 KVA AC Generator.

COAL CRUSHERS
1—26" American Ring Type.
1—24 x 20 Jeffrey Swing-Hammer Mill.

RAILS
5 Tons—16# Relaying Rail.
50 Tons—65# Relaying Rail.
15 Tons—40# Relaying Rail.
Plate Frog Switches—30# to 60#.

MAGNETIC PULLEYS
1—24" Dia. x 26" Face Stainless Steel Ding's, 5' 6" Centers. Complete with mechanism, charger and 1 HP. Gen. Elec. Gear Motor.

WAGON DRILLS
1—Ingersoll-Rand, with drifter, all on pneumatic tires, used about 6 months.
1—Sullivan #IW-6, with drifter, on steel wheels.

VIBRATING SCREENS
1—3' x 6' Single Surface Tyler-Niagara, V-belted to 5 HP. AC Motor.
1—3' x 6' Single Deck Plat-O, Flat Belt Drive to 2 HP. AC Motor.

AIR RECEIVERS
1—60" x 13', Riveted.
1—30" x 8', Riveted.
2—36" x 8', Riveted.
1—36" x 6', Riveted.

MOTORS—AC
16—¼ HP. New Leland Single Phase Motors.
10—⅓ HP. New Leland Single Phase Motors.
8—½ HP. New Leland Single Phase Motors.
2—1½ HP. New Leland Single Phase Motors.
2—2 HP. New Louis Allis 3 Phase Motors.
1—3 HP. New Leland 3 Phase Motor.
1—5 HP. New Leland 3 Phase Motor.
2—1½ HP. Used G.E. 3 Phase Motors.
1—2 HP. Used Wagner 3 Phase Motor.
9—5 HP. Used G.E. 3 Phase Motors.
3—10 HP. Used G.E. & West. 3 Phase Motors.
1—20 HP. Used West. 3 Phase Motor.
2—25 HP. Used G.E. 3 Phase Motors.
2—30 HP. Used G.E. 3 Phase Motors.
3—35 HP. Used G.E. 3 Phase Motors.
1—40 HP. Used Allis-Chalmers 3 Phase Motor.
1—50 HP. Used G.E. 3 Phase Motor.
1—75 HP. Used G.E. 2200 volt, 3 Phase Motor.

SLUSHER HOISTS
1—Ingersoll-Rand, 3 Drum, with direct connected 50 HP. AC. Motor, and 2—1½ Yd. Crescent Scrapers. Unit used about 60 days.

HOISTS
1—No. 22 Vulcan, with Man Cage, 30' Steel Headframe and 40 HP. Single Speed Elevator Type Motor, equipped with Solenoid Brake (Hoist purchased new in 1942).
1—Single Drum Gasoline Hoist, direct connected to 2⅝ x 4¼ Wisc. Gas Engine.

COAL CUTTERS
1—Sullivan CE-7 AC Short Wall, complete with Tip-turn Truck and Reel. New Cutting Machine Parts.

COAL WASHING EQUIPMENT
2—Rheolaveur Launders, complete with Steel Supporting Frame.
1—60" Dia. Dividing Table, direct connected to 2 HP. DC. Motor.
1—Galigher Auto. Sampler with adjustable stroke and direct connected to a 1/6 HP. Motor.
1—12' x 10' Steel Hopper Bin.
1—70' x 12' Dorr Thickener Tank, complete with mechanism.

LARRY CARS
4—Connelsville Larry Cars, Trolley Operated, 6 Ton Capacity.

TROLLEY LOCOMOTIVES
2—7½ Ton Goodmans, 36" Gauge, 250 Volt DC.

MINE FANS
1—8-H60 Jeffrey Aerodyne Exhausting Fan, with 75 HP. Motor—Purchased new in 1942.

PIT CARS
150—Card Iron Works R.B. Pit Cars, 36" Gauge.
1—Card Iron Works Rock Car, 90 Cu. Ft. Capacity.

MISCELLANEOUS EQUIPMENT
1—Kennedy-Otto Drill Press with 1 HP. Vertical Gear Motor.
1—5 HP. Hercules Gas Engine.
1—Ideal Hot Water Boiler, with Stoker and Radiation.
Ingersoll-Rand Cent. Motor Mounted Pumps from 1 HP. to 25 HP.
4" and 8" Deep Well Pumps.
3—6" Hydroseal Pumps.
1—8" Hydroseal Pump.

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MACHINERY AND SUPPLY COMPANY

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Yards: Denver and Florence, Colorado

IMMEDIATELY AVAILABLE—MINING EQUIPMENT

MINING MACHINES

Jeffrey: 3—35BB and one 35BB, 230 volt, 3 phase A.C. 29A, 250 V. 1—24B Low Vein. 4—29B, 29C, 29CE with shearing head. Also 1 on cats. Revolving head for 29C. 2—Longwall 24B.
Goodman: 12A, 12AB, 12AA, 12G3A, Shortwalls.
1—12G3, 220 volt.
1—Hitch Cutter for Cross Head timbers.
1—12H EJ Slabbing Machine, permissible type, 250 and 500 volts.
Sullivan: CE7, CE9.

SUBSTATIONS—275 volts, D. C.

1—75 KW G. E. Rotary Converter.
250 volt D. C. transformers.
220/440—2300/4000.
1—300 KW Westinghouse 3 phase converter.
275 D. C. transformers, 1000/6600 A. C.
1—100 KW Westinghouse MG set.
275 D. C. 2300 volt A. C.
1—100 KW G. E. MG Set.
275 D. C. 440 volt A. C. In portable building.

LOCOMOTIVES

Goodman: All 250 volts.
1—6 ton, 30 B 48". 1—6 ton, 2600-B.
1—5 ton, 9-30 36" gauge.
1—6 ton, type 8A.
Westinghouse Units: All 250 volts.
905, 102, 904 and 115.
Bar steel frames 10 ton, 6 ton, and 4 ton.
G.E.: All 250 volts.
6 ton, 803, 44", rebuilt.
8 ton, 820. Dismantled.
1—8 ton type HM 61, 36" or 48" ga.
Tandem Connecters with cables, new, for use with 2—6 ton locomotives, 250 volt.

LOCOMOTIVES

5 ton 825, 44" and 36". Dismantled.
2 motors for 8 ton: 839.
Jeffrey: 8 ton, 250 volts, type MH73. 1—4 ton MH 12 Rebuilt Locomotive motors and Crabs and Reels for Locomotives.

SPARE ARMATURES

Jeffrey: MH88, MH110, MH79, MH73 and MH64-250 V. and 500-V. 29B, 35B and 38A, 35HB, 35A, 29C, 29L, 35L.
Goodman: 30B, 30C, 12A, 12AB, 112AA.
General Electric: 901, 819, 821, 825, 839, 61. 100 KW TC-6, form A. Bracket Type, 150 KW G. E. HCC, form A.
Westinghouse: 904, 905, 102, YB2, 115, 250 V.
Sullivan: CE7, CE9 and CE10.

OTHER ITEMS AVAILABLE

Aerial Tramways.
Belt Conveyors: 1 Bucket Elevator Conveyor.
Bit Sharpeners, 2 Sullivan.
Bond Welders: Resistance and M.G. sets.
Circuit Breakers: AC and DC.
Circuit Breakers: Automatic 250 volt.
Circuit Breakers, Manual: 600 amps to 3,000 amps.
Coal Crushers: (double roll) 16"x16", (single roll) 24"x24", 12"x16".
1—30" Williams ⇄3 Coal Crusher.
Conveyors: Scraper type. Apron and grate bar screening type.
Screens: 1 shaker 3 track, feeder reciprocating and apron pan type.

OTHER ITEMS AVAILABLE

Compressors & Junkhammers, Compressors.
Drop Bar Supports: (Gooseneck) 29B and 29C, 1 Revolving head for 29C.
Dumps: Crossover.
Field Frames. Goodman 29-A. 15 ton and others.
Generators: DC 250-275 volt, 30 KW to 125 KW. 1—AC Generator, 31.3 KVA, 3 ph. 208 volt, General Electric with Exciter.
Hoists, overhead: AC 3-60-440-220, 1 ton and 2 ton. Crabs and Room Hoists. Also single and double drum.
Lathes: 48"x14' with Taper Attachment and 3-60-220 Motor.
Loading Machines: 2—Myers-Whaley ⇄3 and 4. 1—491 Joy loading machine.
1—12BU Joy loading machine.
Milling Machines: horizontal and vertical.
Mining Machine Trunks and 3 on Cats, for short-wall and arc wall.
Monitors.
Motor Starters and Controllers: AC and DC. Synchronous Motor Starters, full magnetic, across the line. 2-60-4150. 2—200 H.P. and 7—250 H.P. 1—165 H.P., 440 volt for slip ring motors. 1—100 H.P., 250 volt D.C. Both reversible.
Pumps: Rebuilt and New.
Scales: Mine Car and Truck.
1—Slate Lurry.
3—Car haul trip makers.
Transformers: 4—55 KVA 23,100/12,000 to 103/208. 3—35 KVA, 22,900/12,000 to 178/89 volts. 3—100 KVA 6,600/12,000 to 2,300.

GUYAN MACHINERY COMPANY, Logan, W. Va.

SCALES - CRUSHERS VIBRATING SCREENS CONVEYORS - FEEDERS

Conveyor for mines and tipples priced from	$ 665.00
Picking Table	665.00
Reciprocating Plate Feeders	600.00
Stoker Coal Crusher	474.00
Large Coal Crusher	1,074.00
15-ton Truck Scale	450.00
20-ton Truck Scale	510.00
33-ton Truck Scale, 34' platform	1,650.00
5-ton Tipple Scale	312.00
10-ton Tipple Scale	582.00
Vibrating Screens, 2' to 5' wide, many lengths, 1 to 5 decks. All with screen cloth or plates to customers' specifications. Priced from	648.00

BONDED SCALE & MACHINE COMPANY
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Phone Garfield 2186 University 2832, Evenings

FOR SALE AT RIGHT PRICE:

1—Sterling Diesel Tandem Tractor with a new H.B. 600 Cummings Motor. Tractor completely rebuilt two months ago by Sterling Motors.

1—90 Ton Rogers "I" Beam Trailer.
1—Rogers Low-boy 80 Ton Drop Deck. 16—750x18 Tires.

WANTED
1—Model 132 Hanson Shovel Front.

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T. J. KILMAIN SALES CO.
North Mt. Vernon Ave., Uniontown, Penna. — or call Uniontown 5400

HIGH GRADE TOOLS

96"x96"x36' Cincinnati Planer.
36"x36"x12' Cincinnati Pygra Planer.
⇄4 Gisholt Turret Lathe.
13"x6' bed LeBlond Regal Lathe.
4"x12" Landis Plain Cyl. Grinder.
14x18x72 Gallmeyer Livingston Surface Grinder.
⇄3-12 Arter Surface Grinder.
24", 36" & 42" Bullard Vertical Turret Lathe.
2' to 7' Plain Radial Drills.
16" and 24" G. & E. Shapers.
18"x54" centers Lodge & Shipley, late type, Lathe.
⇄4 Cincinnati Vert. Miller, late type.
120 A 51 Gardner Opposed Wheel Grinder.
20" Cincinnati Univ. Shapur, late type.

Also various other machine tools.

Send us your inquiries

Cincinnati Machinery Company, Inc.
217 E. Second St. Cincinnati 2, Ohio

BRAND NEW WIRE ROPE FOR SALE

Improved Plow Steel, preformed. Ind. Wire Rope Center. 7/8" dia., 6x19. 15 reels—2,000 ft. each reel.
Also 1 1/4"; 1 1/4"—6x19, Ind. Wire Rope Center.
In addition to, all sizes hemp center, both black and galv.
Drop forged galv. wire rope clips, all sizes.
Chain hoists, proof coil chain, conveyor belting.
Prices way below market. Immediate shipment.

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CONVEYORS

Belt, Bucket, Drag or Gravity
Shaker & Vibrating Screens
Truck Scales — Coal Crushers
Coal Drills — Mine Fans
Electric Motors — Floor Cranes
Mining and Stripping Equipment

WHAT DO YOU NEED?

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910 First National Bank Bldg., Atlantic 6387
Pittsburgh 22, Pa.

907C—Westinghouse 10 Ton—36" gauge bar steel frame, 250 volt, new steel tired wheels, gears and axles. Extra rewound armature for same.
General Electric—807C—48" gauge, 250 volt, C I frame, A-1 condition.
Jeffrey 5 Ton, 36" gauge battery locomotive.
Atlas 5 Ton, 36" gauge battery locomotive.
Many other items of very fine equipment. Pumps, AC and DC motors, transformers, control equipment AC and DC, mine hoists, several 250 volt armatures for electric shovels.
Phone, wire or write your inquiries. What have you for sale? I rent, buy, sell and exchange.

E. P. DIETRICK
Phone 3-7357
829 Richmont St. Scranton 9, Pa.

NEW and REBUILT STORAGE BATTERY

LOCOMOTIVES

1 1/2 to 10 Ton 15" to 56" Track Gauge

GREENSBURG MACHINE CO.
Greensburg, Pa.

BUY NOW—IMMEDIATE DELIVERY
Caldwell 200 tons Horiz. Hydraulic Wheel Press.
Bradley 200⇄ Helve Hammer (Motorized).
LeBlond 36"x20' Q.C.G. Engine Lathe.
Cincinnati ⇄4 and ⇄5 High Power Horiz. Millers.
Columbia 32" B.G. Hex. Duty Shaper.
Niles, B & Pond 200 tons Hydr. Horiz. Wheel Press.

FALK MACHINERY COMPANY
18 Ward St., Rochester, N. Y. Phone Main 6347

REBUILT EQUIPMENT—READY TO SHIP

AXIAL FLOW VENTILATING FANS

5—60" dia. 72¼" long, 2 sets of propellers, 8 blades to each. Diam. of blade 16"x9½" curved m/f'd by International. Size 114, driven by 100 HP., 1750 rpm., 220/440 v. 3 ph. 60 cy. A.C. Motor.
6—16000 CFM Buffalo Forge Co., 3" stat. pres. 1800/1200 rpm. con. 15/4.5 HP., 1710/1150 rpm., 3 ph. 60 cy. G.E. A.C. Motor 220/440 v. all enc'l.
2—12000 CFM 3" stat. pres. Sturtevant with dir con. 10/3 HP., 1775/1180 rpm., 220/440 v. West. CS. TEFC Motor.
1—7500 cfm Clarage with dir. con. 7½ hp., 1750 rpm., 3 3 hp at 1160 rpm., 220/440 v. 3 ph. 60 cy.
31—6000 cfm. Sturtevant Bulletin 512389, 2" stat. pres. 7 blade, dir. con 5/1.5 HP., 1745/1175 rpm., 220/440 v. 3 ph 60 cy. West. TEFC Motors.
2—5000 cfm Sturtevant 1.8 stat. pres. 4.2/1.25 HP., 1750/1150 rpm., 3 ph. 60 cy., 220/440 v. ball-bearing motors.
1—4000 cfm 3" stat. pres. Sturtevant Axial Flow vent fan dir. con. 4/1.2 HP., 1750/1150 rpm., 220/440 v., 3 ph. 60 cy. Tot. Enc. West. Motor.

HOISTS

1—Welen—2 drum 8600# per drum, each drum is 6" cir. with 450 ft. of ⅝" cable per drum can be increased to take 600'. 120 FPM per drum, driven by 25 HP., 1750 rpm., 230 V. D.C. Mtr.

HOISTS or WINCHES

200—1½-ton Hand Cranked ratio 27.1 thru an enclosed double reduction gear unit with 4 planetary gears mounted on steel plate complete with 48' of ¼" cable, ratchet type brake, push button release.

CAR PULLERS

100—Brand New with ¼" cable, 1½ and 2 ton A.C. or D.C. Motors.

LOCOMOTIVES

6 ton Atlas, 230 v. D.C.—36" gauge.

230 V. D.C. MAGNETIC STARTERS AND CONTROLLERS

456—New, 1 HP. Cutler Hammer across the line.
111—New, 1 HP. Cutler Hammer across the line.
30—New, 3 HP. Cutler Hammer across the line.
65—New, 5 HP. Cutler Hammer drip proof 3 step current limit OL and LV.
58—New 7½ HP. Cutler Hammer.
19—10/15 HP 230 V. Westinghouse Magnetic Drip Proof Controllers, 2 steps acceleration thermal overload relay with stop, start and reset buttons.
9—New, 10/15 HP., 230 v. G.E.
10—New, 40 HP., 230 v. G.E. Magnetic.

PUMPS — with AC or DC Motors

Qua.	GPM	Head	Make
2	1300	377'	Worthington
2	1200	300	Worthington
2	1100	323	Worthington
2 New	1000	340	Worthington
1	1000	370	Worthington
2	900	300	Worthington
6	800	370	Worthington
2	800	150	Worthington
2	700	288	Worthington
2	600	185	Worthington
1	600	220	Dayton Dowd
2	600	203	Worthington
2	400	196	Worthington
1	332	262	Worthington

230 V. D.C. MOTORS

Qu.	HP	Make	Type	Speed
2	200	Reliance	1070T	400
1	150	Gen. Electric	RCP-56	1700
1	125	Westinghouse	SK-190	500
4	100	Reliance	1050T	400
2	100	Westinghouse	SK-190	640
1	100	Gen. Electric	RC-58	850
3	100	Westinghouse	SK	650
3	90	Westinghouse	SK-183	575
1	75	Westinghouse	SK-180	850
3 new	75	Cr. Wh.	TEFC	800
1	60	Westinghouse	SK-123	1750
1	60	Westinghouse	SK-153	850
2	50	Westinghouse	SK-143	850
1	35	Gen. Electric	DLC-303	700
2	25	Allis Chal.		1800
1	30	Allis Chal.		575
1	30	Westinghouse	SK-122	850

MOTOR GENERATOR SETS—250 V., D.C.

Motors: 220/440 or 2200 volts—3 phase 60 cycle

No.	KW	Make	RPM
3	250	Westinghouse	1200
1	200	Westinghouse	720
2	200	Westinghouse	1200
1	100	Westinghouse	700
1	100	General Electric	900
1	100	Westinghouse	600
1	100	General Electric	1800
1	100	Reliance	540
1	100	Delco	1200
1	90	Westinghouse	450
4	75	Westinghouse	720
1	75	Westinghouse	1200
1	60	Westinghouse	1200
1 NEW	50	General Electric	1800
2	40	Westinghouse	900
2	30	Westinghouse	720

250 VOLT D.C. GENERATORS

No.	KW	Make	Type	RPM
3	250	Westinghouse		1200
1	200	Westinghouse	SK	500
1	110	Westinghouse	SK-190	700
8	100	Reliance	1050-T	580
1	100	Westinghouse	SK-183	720
1	100	Westinghouse	SK-190	720
1	100	Westinghouse	SK-180	900
6	100	Delco		1200
1	100	General Electric	RC-58	850
1	100	Westinghouse	SK	850
1	100	General Electric	RCP-36	2100
1	75	Allis Chalmers		850
2	75	Westinghouse	SK	1440
1	60	Westinghouse	SK	2100/1950
1	60	Westinghouse	SK-153	1100
1	50	Westinghouse	SK-180	400
1	50	General Electric	DLC 203	850
1	50	Westinghouse	SK-143	1100

SLIP RING MOTORS—3 PHASE 60 CYCLE

No.	H.P.	Make	RPM	Volts
1 NEW	400	Westinghouse	600	2300
1	250	Allis Chalmers	870	2200
1 NEW	200	General Electric	600	220/440
1	200	Westinghouse	1800	220/440
1	150	General Electric	1800	220/440
1	150	Westinghouse	1150	220/440
1	125	Westinghouse	900	2200/220/440
1	100	Westinghouse	720	2300/220/440
1	100	Triumph	540	550/220/440
1	75	General Electric	600	550/220/440
1	75	General Electric	720	220/440
1	75	General Electric	900	220/440
1	75	Westinghouse	1800	220/440
1	60	Westinghouse	900	220/440
1	60	General Electric	720	220/440
2	50	Westinghouse	870	220/440/2200

ENGINE GENERATOR SETS

10—NEW 1 kw 14.25 v. D.C. and 2 kw. 28.5 v. D.C. Homelite portable gas eng. sets. Can furnish lamps and batteries. Suitable for farms and camps.
3—8 kva. 120/240 v. 1 ph. 60 cy. Witte Diesel.
30—NEW 25 kva. West. 120/208 v. 1 and 3 ph. 60 cy. LeRoi GAS.
12—100 kw., 240/120 v. Delco 1200 rpm. dir. driven by 150 HP. Superior GBD-8 8½"x7" 8 cyl. DIESEL.
1—125 kva. G.E. 220/440 v. 3 ph. 60 cy., dir. con. Skinner UNIFLOW Engine.

SPECIAL BARGAIN

100 KW. Diesel Engine Generator Sets
11—100 kw., 250-275 v. D.C. Delco Generators dir. con. to 150 HP., GBD-8, 5½x7, 8 cyl. Superior Diesel Engines, elec. starting with muffler, power panel and accessories. ALMOST NEW—ONLY USED AS SPARES.

BRAND NEW TURBO SET

Westinghouse Steam Turbine consisting of 200 kw., 220/440 v., 3 ph. 60 cy. 1200 rpm., 80% P.F. A.C. Generator—40 kw., 120 v. 1200 rpm., D.C. Exciter and Westinghouse Reduction Gear—Non condensing. Send for Catalog.

SPECIAL BARGAIN AIR COMPRESSORS

5—240 CFM Westinghouse type 3 VB-23 3 cyl. vert., 150 lbs. pres. dir. con. to 50 HP., 220/440 or 2200 v. 3 ph. 60 cy. West. Slip Ring Motors, auto. Control. Can furnish D.C. Motors or Oil or Gasoline Engines if desired.

DUQUESNE ELECTRIC & MFG. CO., PITTSBURGH (6), PA.

Write for New Stocklist — Montrose — 5800

MINE AND SLOPE HOISTS

1—20,000# Vulcan Dbl. Drum AC
1—35,000# Nordberg Sgl. Drum AC
1—10,000# Nordberg Sgl. Drum AC
1—17,000# Ottumwa Sgl. Drum AC
1—10,000# Lidgerwood Sgl. Drum AC
1—16,000# Lidgerwood Sgl. Drum AC
1—15,000# Wash. Iron Wks. Sgl. Drum AC
1—20,000# Allis Chalmers Sgl. Drum AC
1—20,000# Mundy Dbl. Drum, W/o motor

CRUSHERS

2—#800H Pitman, new
1—12x16 Eagle Dbl. Roll
1—3H American Pulverizer
1—30x54 McNally Pitts. Sgl. Roll
1—19x20 Universal Sgl. Roll Portable
1—24x20 Penn. Sgl. Roll
1—#75 Marcy Ball Mill
1—24x20 Dixie Hammer Mill
1—40x22 Pioneer Dbl. Roll with Hopper
1—20x60 Jeffrey Sgl. Roll AC
1—Mead-Morrison Dbl. Roll, Cap. 100 TPH, #98
1—Ken. Van Saun Gearless, complete, AC

DIESEL GENERATOR

Units, 75 to 900 KW with diesel engines

DIESEL CRANES — SHOVELS

1—5 yd. Marion Elec. Shovel, WL control with Diesel MG set. New.
1—9 yd. Page Diesel D/L crane
1—4 yd. P&H Diesel D/L crane, comb.
1—TD24 Int'l Tractor, new

HAWKINS AND CO.

154 So. Michigan Ave. Chicago 3, Ill.
Phone: HArrison 7-0725

SHOVELS — DRAGLINES

Model 1400 P&H 4 yard electric shovel. 32' boom, 21' stick, Magnatorque hoist. New February, 1948. Machine like new. Bargain.

Model 1500 P&H electric dragline with 135' boom, 4 yd. bucket. Machine in excellent condition.

Model 900 P&H dragline. 100' aluminum boom, 3½ yd. bucket, Fairbanks-Morse diesel engine. Machine about 10 years old, but in very fine mechanical condition. Bargain price.

37-B Bucyrus-Erie 1½ yd. diesel shovel. D13000 Caterpillar engine. Machine rebuilt. Bargain.

Model 625 Page diesel dragline. 140' boom, 9 yd. bucket.

Model 595 Link-Belt dragline. 85' boom, 2½ yd. bucket, D17000 Caterpillar diesel engine. Very good condition.

Parmanco vertical auger drill. New. Mounted on Dodge Power Wagon.
D-7 Caterpillar and **TD-9 International** tractors.

FRANK SWABB EQUIPMENT CO.

Hazleton National Bank Bldg., Hazleton, Penna.

Telephone 4910

MOTORS and ELECTRICAL EQUIPMENT

ENGINEERED AND REBUILT BY SPECIALISTS IN OUR MODERN PLANT

SQUIRREL CAGE MOTORS
3-PHASE 60 CYCLE

Qu.	HP.	Make	Type	Volts	R.P.M.
1	30	Whse.	CS	550	900
2	40	Al. Ch.	AR	440	900
1	40	Master	PA-440	440	1200
1	50	Whse.	CS	440	600
1	50	F.M.	H-16-A	440	900
1	50	Al. Ch.	AR-220D	440	1155
1	50	Ideal	AT-445	440	1750
1	60	Whse.	CS-607	440	880
1	75	G.E.	KT-356	440	860
1	75	G.E.	KF-542	440	1200
1	75	WHSE.	CS	440	1750
1	75	Al. Ch.	AR	2300	1765
5	100	F.M.	HB-201C	440	880
1	100	WHSE.	CS-760	2300	1170
1	100	G.E.	KT-556	2200	885
2	100	G.E.	K-566	2300	1175
1	100	Al. Ch.	AR	2200	1160
1	100	G.E.	I-E	440	1800
1	100	WHSE.	CS-663	440	1750
2	125	Al. Ch.	AR	440	435
1	125	WHSE.	CS-761	440	1750
1	125	WHSE.	CS-7725	2200	1170
1	150	G.E.	I-E	440	690
1	150	El. Mchy.	B B	440	1200
1	150	WHSE.	CS-7729	2300	1170
1	200	Al Ch.	AR	440	600
1	250	WHSE.	CS	2200	1200

TRANSFORMERS (OIL COOLED)
1 PHASE—60 CYCLE

Qu.	K.V.A.	Make	Voltage
2	10	WHSE	2400-440/230
2	18	KUHLMAN	480/240
1	25	ALLIS CH.	2300-460-230
1	30	G.E.	2200/1100-cov
5*	37.5	WHSE.	460-230-230/115
3	50	ALLIS CH.	2300-220
2	50	WAGNER	13200/11880-575/287
14 (NEW)	100	G.E.	4330/4160-125/250
3	130	G.E.	1900/9500-2200/550
3 (NEW)	150	WAGNER	8000/4400-2300
3	667	G.E.	2300/4000Y-400

—AIR COOLED.

SLIP RING MOTORS—CONSTANT DUTY
3-PHASE 60-CYCLE

Qu.	HP.	Make	Type	Volts	R.P.M.
2	5	Al. Ch.	ARY	440	690
1	7½	G.E.	MT	550	870
1	10	Howell		440	600
1	15	G.E.	MT 332	440	845
1	15	Whse.	HF	440	1150
2	15	G.E.	I-M	220	1125
1	20	G.E.	MT 326	220	850
4	25	G.E.	MT 526	440	850
1	25	G.E.	MT 332	2200	850
1	25	Al. Ch.	ARY	2200	860
2	25	Whse.	CW-4810	220	1150
1	30	Whse.	CW	440	1160
1	40	Al. Ch.	ARY	2200	435
1	40	G.E.	MT 346	550	560
2	40	G.E.	I-M	600	1170
1	50	Al. Ch.	ARY	2200	490
2	50	G.E.	MT 536	2200	1150
1	75	G.E.	I-M	220	605
1	100	Whse.	CW-8546	550	600
1	125	Al. Ch.	ARY	440	900
1	150	G.E.	I-M	440	1160
1	150	G.E.	I-M	2200	1750
1	200	G.E.	I-M	2200	600
1	200	Al. Ch.	ANY	2200	600
1	250	Whse.	CW-1106	2200	1800
1	300	Al. Ch.	ANY	2200	505
1	300	G.E.	I-M	2200	1200
1	400	G.E.	I-M	2200	900
1**	450	G.E.	MT	2200	257
1**	600	G.E.	MT-412-Y	2200	719
1**	750	G.E.	MT-414-Y	2200	709
1**	1200	Whse.	CW	2200	500

*60 CYCLE.

** MILL TYPE 2 PEDESTAL BEARING ON ANY CAST IRON BASE COMPLETE WITH REVERSING PRIMARY AND MAGNETIC SECONDARY CONTROL.

Can supply control, MANUAL or MAGNETIC CONTROL for any of the above motors ENGINEERED to your requirements.

MOTOR GENERATOR SETS
3-PHASE 60 CYCLE

Qu.	KW.	Make	RPM.	Volts D.C.	Volts A.C.
1	5½	G.E.	1800	230	220/440
1	9	G.E.	1800	230	220/440
7	25	Whse.	1200	120/240	220/440
5	50	Whse. (3 Unit)	1200	120/240	440/2200
2	85	G.E.	1800	125	220/440
1	50	Le. Al.	1200	120/240	440/2300
7	75	Whse.	1200	125	220/440
1	75	Al Ch.	900	250	2300
1	100	G.E.	1200	250	440/2300
1	100	C.W.	1200	250	440/2300
1	200	G.E.	720	250	440/2200
1	300	G.E.	720	250	440/2200
1	600	G.E.	720	300	2300
2	1000	G.E.	514	600	4150/2300

Above furnished complete with A.C. and D.C. panels and A.C. control.

ROTARY CONVERTERS

2225/2565 K.W. 225/285 V.D.C., G.E. 9000 Amp., 450 R.P.M., with booster.

2760—K.V.A. Transf., 6900-V., 3-PH., 60 CY., complete control and D.C. distribution cubicles.

SYNCHRONOUS MOTORS — ALTERNATORS
3-PHASE 60 CYCLE

Qu.	HP.	Make	P.F.	Volts	RPM.
2	200	Al. Ch.	1.0	2300/440	300
1	20	Whse.	.8	220	1800
2	50	G.E.	.8	2200	600
1	60	G.E.	.8	440	1200
2	100	G.E.	.8	440	600
1	100	Ideal	.8	220	900
1	100	Whse.	1.0	2200	1200
2	100	Whse.	.8	440	1800
1	125	G.E.	.8	2300	900
1	150	G.E.	.8	440	720
1	150	G.E.	1.0	2300	900
1	220	G.E.	.8	480	720
2	200	Al. Ch.	1.0	2300/440	360
1	400	Whse.	.8	440	600

(2) **NEW** 1000 K.W. generator or 1250-HP., **Sync. Motors.** G.E. type A.T.I., 4160/2300-V., 3-PH., 60 CY., 360 R.P.M., dir. con. exciters, pedestal bearing design. Can furnish control equipment and panels.

T. B. MAC CABE COMPANY

4314 CLARISSA STREET — PHILADELPHIA, PENNA.

AIR COMPRESSORS:
12—Belted, 380, 678, 870, 1,000, 1,300 ft.
12—Diesel, 105, 315, 520, 626 & 1,000 ft.
6—Electric, 1,300, 1,500, 2,200, 5,000 ft.

CARS & LOCOMOTIVES:
80 Ton Whitcomb Diesel-Elec. Locomotives.
100—50 ton cap. Gondolas.
35—50 ton cap. Flat Cars.
8—100-ton, 45-ton, 30-ton Diesel Locomotives.
50—20 yd. cap. Air Dump Cars.
6—10, 16, 20 & 30 ton Gas Locomotives.
150—8,000 & 10,000 gal. cap. Tank Cars.

ELECTRIC LOCOMOTIVES:
13—3, 5, 8 ton Battery & Trolley.

DIESEL GENERATORS:
12—100, 150, 180 & 400 K.W.

MINE LOADERS:
17—GD9, Eimco 21, Conway 20, 30, 60 & 75 and Sullivan HL3.

STEEL TANKS:
30—8,000, 10,000 and 20,000 gallon capacity.
9—80,000 & 20,000 bbl. cap.

LARGE SHOVELS—DRAGLINES
1—12 Yd. Cap. Bucyrus Erie Elec. Shovel.
2—10 Yd. Cap. Marion Elec. Shovels.
1—8 Yd. Cap. Marion Elec. Shovel.
1—7 Yd. Cap. Marion Diesel Dragline.
1—6 Yd. Cap. B. E. Monighan Diesel Dragline.
1—5 Yd. Cap. Marion Elec. Shovel.
1—4 Yd. Cap. Marion Diesel Shovel.
5 Steam Shovels—3½, 5, 6 and 8 Yd.

R. C. STANHOPE, INC.
60 E. 42nd Street — New York 17, N. Y.

MOTOR GENERATORS

500 KW G.E. SYN. 275 V. 900 RPM. 2300/4000 V. 3 PH. 60 CY. SWITCHGEAR.

500 KW G.E. SYN. 575 V. 900 RPM. 2300/4000 V. 3 PH. 60 CY. SWITCHGEAR.

400 KW WEST. SYN 575 V. 720 RPM. 2300/4000 V. 3 PH. 60 CY. SWITCHGEAR.

300 KW G.E. SYN. 275 V. 1200 RPM. 2300 V., 3 PH. 60 CY. SWITCHGEAR.

150 KW G.E. SYN. 275 V. 1200 RPM. 2300/4000 V. 3 PH. 60 CY. SWITCHGEAR.

SYNCH. CONVERTER

300 KW G.E. 575 V. 6 PH. 60 CY. 1200 RPM. Pedestal Type. 2300/4000 V. TRANSFORMERS and SWITCHGEAR.

LOCOMOTIVES

30-T Jeffrey 250 V.MH-77 Mts. 48"-36" Ga.
20-T Jeffrey 250 V.MH-77 Mts. 48"-36" Ga.
13-T Jeffrey 250 V.MH-110Mts. 42"-32" Ga.
10-T Jeffrey 250 V.MH-110Mts. 42'-32" Ga.
8-T West 250 V. 906-C Mts. 44"-36" Ga.
6-T West. 250 V. 903-B Mts. 32"-22" Ga.
6-T G.E. 250 V.HM-701 Mts. 32"-24" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK CO.
501 Grant Building — **Pittsburgh, Pa.**

FOR SALE

25 ALL STEEL, FOUR POCKET, 70 TON HOPPER CARS equipped with MULTI WEAR STEEL WHEELS. Located near Philadelphia.

CHARLES DREIFUS CO.
12 S. 12th St., Philadelphia 7, Pa.

IRON and STEEL PIPE
New and Used
Large stocks, all sizes
attractive prices

L. B. FOSTER COMPANY
P. O. Box 1647 — Pittsburgh 30, Pa.

Electrical Equipment

Converters, Motor Generator Sets, A.C. and D.C. Motors, Control Equipment and Transformers.

We build equipment to fit your requirements. Over 25 years engineering background.

C. B. LOCKE
P.O. BOX 3227
TEL. 38-136
CHARLESTON, W. VA.

NEW and REBUILT

MOTORS

150 HP. 900 RPM. Elec. Mach., 220 3 60 Syn.
80 HP. 1200 RPM. Cr. Wh. 220 440 3 60 Ind.
75 HP. 900 RPM. Elec. Mach. 220 3 60 Syn.
75 HP. 1800 RPM. US. 220 440 3 60 Syn.
65 HP. 1200 RPM. GE. 220 440 3 60 Ind.
50 HP. 1200 RPM. GE. 220 3 60 Slip Ring.
5, 7½, 10 and 15 HP new and used fafc & opso.
5 to 100 HP DC motors for stock shipment.

SYNCHRONOUS ROTARY CONVERTERS

Qu.	KW	Make	Speed	DCV
1	500	Whse.	1200	600
2	300	G.E.	1200	600
1	300	Whse.	1200	275
4	175	G.E.	1200	275
		3 ph. 60 cycle		
1	175	G.E.	1200	275
1	75	G.E.	1800	275

M-G SETS — ROTARIES
3 ph. 60 cy.

450 KW G.E. 275 v.—2300 v. Syn. 720 RPM with control.
300 KW G.E. Rotary. 275 v. with 2300-1000 v. Trans. & control.
150 KW West. 125-225 HP Ind. 2200/440/220 v.
100 KW West. 275 v.—150 HP Ind. 2200/440/220 v.
100 KW West. 125 v.—150 HP Ind. 2200/440/220 v.
75 KW West. 75 v.—100 HP Ind. 440/220 v.
50 KW G.E. 125 v.—75 HP 2200/440/220 v.
40 KW West. 275 v.—60 HP Ind. 440/220 v.
35 KW G.E. 125 v.—50 HP Ind. 440/220 v.
15 KW Watten 125 v.—25 HP 440/220 v.
10 KW 125 v.—15 HP Master 440/220 NEW.

MOTORS AND GENERATORS

300 HP. West. CW 2300/3/60 600 RPM S.R.
300 HP. G.E. I M 2300/3/60 450 RPM S. R.
150 HP. G. E. Syn. 220/440/3/60 600 RPM.
100 HP. Al. Ch. ABY 2200/3/60 600 RPM S R.
100 HP. G.E. IM 440/220/3/50 450 RPM S.R.
300 KW West. 250 v. 1200 RPM Gen.
150 KW Triumph 250 v. 600 RPM Gen.
150 KW G.E. 550 v. RC 1150 RPM Gen.
125 KW West. 250 v. 1200 RPM Gen.
100 KW West. 125 v. 1200 RPM Gen.

LOCOMOTIVES
Haulage and Gathering

20 25 Ton G.E. outside 4" armorplate frame, steel tires, 3MM, 8/4 BB Motor, 125 HP. each, 500 v., 42 or 44" Ga.

13 Ton West. 36 or 40" Ga., 250 v.
8 Ton Goodman Explosion tested 500 v., 42/44" Ga.
6 Ton West. 250 v., 904 Motors 28" Ga.
2 4 Ton Goodman, 250 v., 42" Ga., sgl. motor, cath.

STORAGE BATTERY LOCOMOTIVES

6 7 Ton Jeffrey 42/44" Ga., BB Motors.
6 Ton G.E. perm., 36/44" Ga., HM 825 BB.
5½ Ton Ironton Type A 36/42 Ga.

MINING MACHINES

2 - 112 BJ Goodman Universal, 220 v., 7½" bars.
2 - 12 BA Goodman 250 v., 190 cy. to 7½" bar.
2 - 35 B Jeffrey, 250 v., 65½ to 7½' bars.

HOISTS, CRANES AND PUMPS

300 HP Lidgerwood sgl. fixed drum, 6½' dia., 3' face, 5" flanges grooved—1¼" cable, 300 HP G.E. 2300 4000 3/60 with magnetic control.

75 HP Diamond fr. 48" dia. 25" face, sgl.
75 HP Mead Morrison sgl. fr. drum AC Motor.
1 - 50/75 HP 2 drum Meade Morrison slope.
50 HP Herl & Patterson sgl. fixed drum, 4' dia., 4' face with AC or DC Motor.
10 HP Lidgerwood sgl. fr. drum geared to A.C.

PROMPT SHIPMENT ON ALL SIZES A. C. AND D. C. REBUILT MOTORS.

MOORHEAD ELECTRICAL MACHINERY CO.
Pittsburgh 19, Pa. Mayflower 7900

Wagner
"CERTIFIED REBUILT"

M-G SETS—AC to DC
250 KW Allis Ch. DC 250 V., synch. motor 440 V.
150 KW Cr. Wh. DC 250 V., synch. motor 440 V.
100 KW G.E. DC 250 V. motor, 2200 V.
80 KW Star DC 250 V., synch. motor 440 V.

D.C. MOTORS—230/250 V.
150 HP Cr. Wh. b.b. TEFC 990 RPM.
100 HP Whse. SK181 450 900 RPM.
100 HP G.E. type C 575 1150 RPM.
80 HP G. E. CDM 1,000 RPM, b.b. drip (2).
75 HP Cr. Wh. CMC, 1150 RPM, bb. (3).
75 HP Allis-Ch. E, 500 RPM, auto starter.
60 HP Whse. SK 1700 RPM.
50 HP G.E. CD 123 850 RPM.
40 HP Whse. SK133 850 RPM.
25 HP G.E. CD85, 1750 RPM.
20 HP Whse. SK93 1150 RPM. (2).
15 HP Whse. SK 850 RPM. (5).

Complete Stock A.C. Motors—New and Rebuilt Up to 500 H.P.—Sq. Cage, Slip Ring, Synch.
SPECIAL—2—300 H.P. Allis-Ch. slipring motors, 720 RPM, 2,200 volts, with controls.
Gear Head Motors Speed Reducers Pumps—Blowers
WRITE — WIRE — PHONE

ARTHUR WAGNER CO.
1433 W. Randolph St. Chicago 7
ELECTRIC MOTORS - GENERATORS

Caterpillar Tractor, Model 30 PS Series w/ side boom.
Caterpillar Tractor Mod. 20, PL Series w/ end winch.
Auto Car 1943 Model U7144 w/ Enclosed Cab.
Boiler Tubes • Pipe
Gas Engines • Machinery

BRADFORD SUPPLY COMPANY
Wayne, Wood County, Ohio Near Toledo

MINE HOIST: All steel construction, single drum, 8' dia., 3,700 ft. 1½" rope, single line pull capacity 23,000 lbs. with herringbone gears to operate at a speed of 200 or 600 FPM; motor 400 H.P., 580 RPM, 3 phase, 60 cycle, 2,200 volt, complete with all control equipment. Condition like NEW. Located in California.

GOODRICH SUPER LONG LIFE CORD CONVEYOR BELT (NEW):
1—Piece 1614 ft.
1—Piece 1017 ft.
1—Piece 268 ft.
42" wide, 6 ply, 42 oz. duck, 7/32" top cover, 1/16" bottom cover on original reels. All NEW, NATURAL RUBBER, with or without mechanical parts.

DRAGLINE: ¾ yd. capacity, 110' boom, 2,200 volt, A.C.

BLAST HOLE DRILLS: Buckeye, Erie 27-T, 29-T and 42-T, diesel, electric and gas, 6" and 9" bits.
2 - Loomis Clipper, gas, 6" bits.

A. J. O'NEILL
Lansdowne Theatre Building
LANSDOWNE, PA.
Phila. Phones: Madison 8300 - 8301

WANTED

TRANSFORMERS
FOR SALE

3— 3 KVA W.H 13200-120/240
12— 5 KVA W.H 13200-120/240
4— 10 KVA W.H 13200-120/240
3— 25 KVA W.H 13200-120/240
3— 25 KVA Mol 13200-120/240
10—37½ KVA W.H 13200-120/240
2— 25 KVA W.H 13200-2400
2—37½ KVA Mol 13200-2400/4160Y
3— 75 KVA W.H 13200-120/240
3— 75 KVA G-E 13200-120/240
1— 75 KVA Mol 13200-2400
1— 100 KVA W.H 13200-2400
10— 1½ KVA Wstg 7200-120/240 "REA"
4— 3 KVA W.H 2400-4800-120/240
4— 7½ KVA W.H 4800/8320Y-120/240
3— 50 KVA W.H 4800/8320Y-120/240
3— 50 KVA G-E 26400-2300/4000Y
3— 50 KVA G-E 33000-2400/4160Y
3— 100 KVA G-E 33000-2400/4160Y
1—Gas Fired Recirculating Young Bros. DRYING OVEN, 2 Compts., complete with controls.

TRANSFORMERS
WANTED

Rewind and repair service on all makes of transformers.

THE ELECTRIC SERVICE CO.
Cincinnati 27, Ohio

WANTED

¾ to 5 yard Shovels
2 to 10 yard Draglines
Tractors and Dozers

Frank Swabb Equipment Co., Inc.
Hazleton National Bank Building
Hazleton, Pa.
Telephones 4911 and 4910J

WANTED:

Steel Headframe Side Hoist.
Two Cage Ways.
Center to Center Cage Way, 8' 6".
Face to Face of Guide, 8' 10".
Minimum Height, 50' 0".

Geo. S. Eaton & Co.
1100 Union Trust Bldg. Pittsburgh 19, Pa.

Watch—
the *Searchlight Section*
for
Equipment Opportunities

LOCOMOTIVES

1—10 Ton West. with 907C Motors.
1—8 Ton G. E. with HM 819 Motors.
1—8 Ton Jef. with MH 100, 250 V. D. C.
1—6 Ton G. E. with HM823 BB Motors.
1—6 Ton Jef. with MH 88 Motors, 250 V.

CUTTING MACHINES

1—3588 Jef. 250 V. D. C.
1—3588 Jef. S.W. A.C.
1—358 Jef. S.D. D.C.
1—29U Jef. Universal.

LOADING MACHINES

3—14 BU Joy on Cats. D. C.
1—7 BU Joy on Cats D.C.
3—8 BU Joy on Cats D.C.
2—360 Goodman 42" gauge on wheels.
2—12 BU Joy on Cats.
1—3'x10' Ty-Rock Shaker Screen.

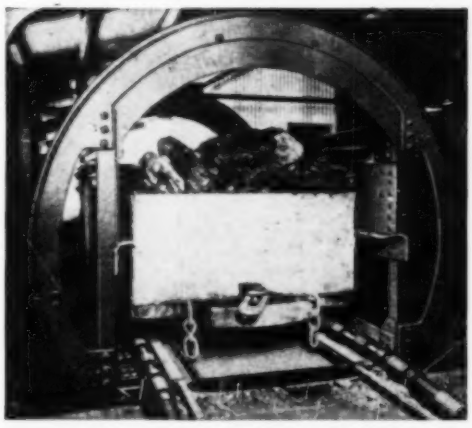
TIPPINS MACHINERY CO.
PITTSBURGH 6, PA.

SEE PAGE 225 FOR APPROXIMATE SUMMARY OF HARD-TO-GET OFFERINGS

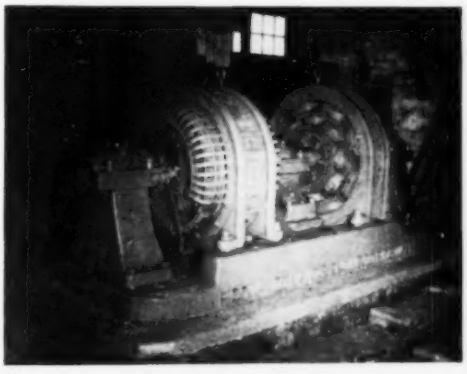
POSSIBLE PRICE INCREASES

This equipment is *NEW* or nearly new. All of our Equipment has been completely over-hauled and Parts replaced with NEW GENUINE FACTORY REPLACEMENTS. Every Item is guaranteed to be as represented, either NEW or nearly new and carries the same guarantee the original manufacturer warrants. We welcome your inspection.

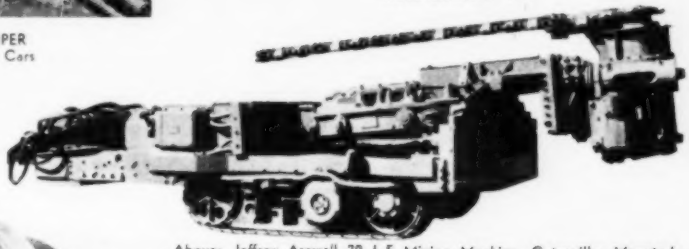
ACT NOW! **Don't wait to modernize your production facilities. This equipment is available *NOW*. It is PRICED right. It IS right. And you get *IMMEDIATE DELIVERY*.**



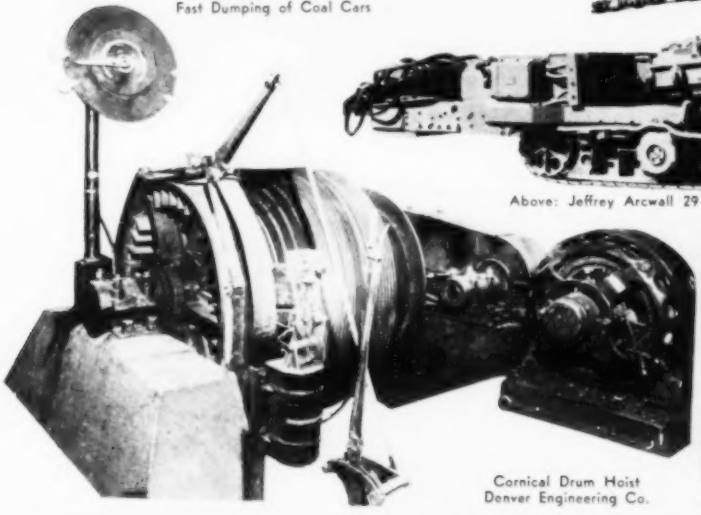
ROTARY CAR DUMPER
Fast Dumping of Coal Cars



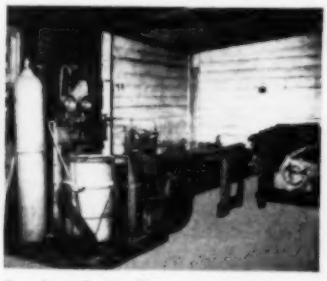
Motor-Generator Sets



Above: Jeffrey Arcwall 29 L-E Mining Machine. Caterpillar Mounted.



Cornical Drum Hoist
Denver Engineering Co.



Complete Cardox Plant—160 Shell Capacity

THE COLUMBINE MINE EQUIPMENT CO., INC.

FLAT IRON BUILDING, 1669 BROADWAY **DENVER 2, COLORADO**

Subsidiary of Portland Equipment Co., 11 Broadway, New York 4, N.Y.

WRITE FOR OUR COMPLETE LIST OF MACHINERY AND EQUIPMENT

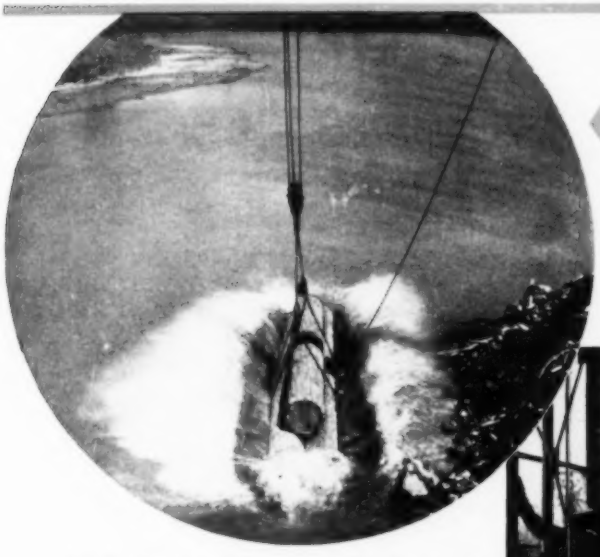
SEE PAGE 225 FOR APPROXIMATE SUMMARY OF HARD-TO-GET OFFERINGS

COAL AGE ADVERTISERS IN THIS ISSUE

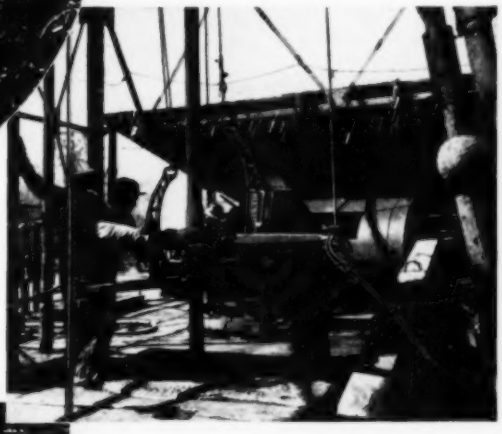
An asterisk preceding manufacturer's name indicates detailed information may be found in the 1947-48 MINING CATALOGS

ADVERTISERS INDEX

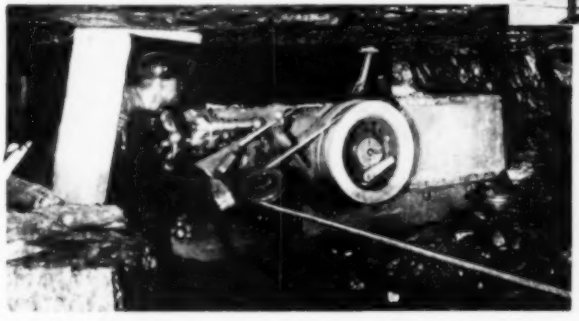
Improving Production with LAY-SET PREFORMED



Dropping logs into the river with a swing boom unloader. When logs hit water an automatic trip on the hooks frees the mainline straps. Buoyancy of logs in water slacks the mainline, and weight jerks hooks free from strap loops. With a load of 5,000 board feet (40,000 pounds), that's a lot of lifting, jerking and quick-slackening for the wire rope—but Hazard LAY-SET Preformed takes it in stride.



In oil drilling—Improved production with LAY-SET Preformed wire rope is quickly evident in the oil fields. Because LAY-SET is a "relaxed" wire rope, it takes bending stresses, whipping and straining—with ease. The result is fast, uninterrupted production—more barrels of oil per day.



Short wall cutting machine at work in a coal mine. Here, where wire rope failures would seriously affect production, operators depend upon LAY-SET Preformed wire rope. Its longer life means steadier, more profitable production.

***LAY-SET** Preformed wire rope will improve production on your lifting and pulling jobs too. Be sure to specify* LAY-SET Preformed *the next time you need wire rope.*

ACCO *In Business for Your Safety*

TRADE MARK

HAZARD WIRE ROPE

A DIVISION OF AMERICAN CHAIN & CABLE

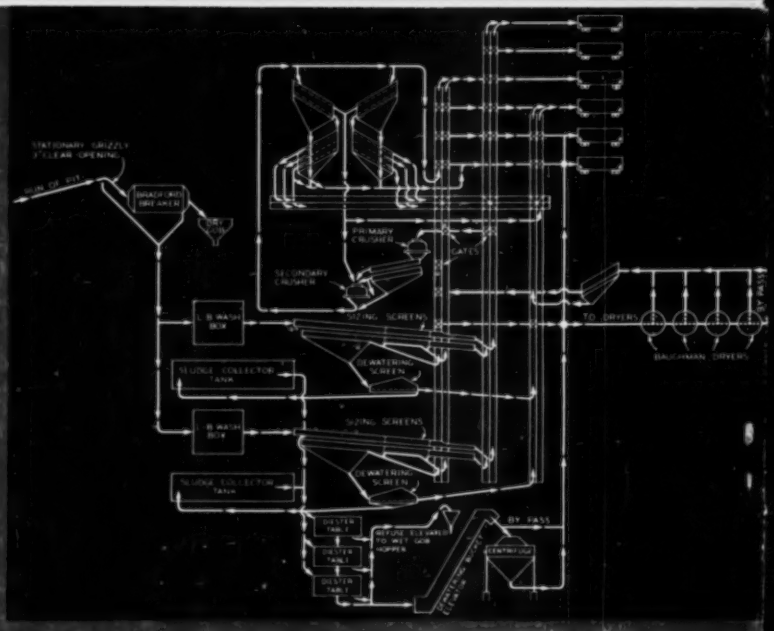
Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, Portland, San Francisco, Tacoma, Seattle, Bridgeport, Conn.

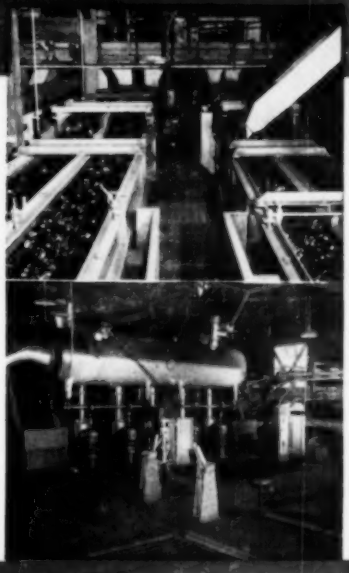
CENTRAL INDIANA COAL COMPANY PLANT

Features

LINK-BELT

two-compartment oscillating conveyors





Again Link-Belt pioneers with new technique and equipment in coal preparation and handling, at the new strip mine of the Central Indiana Coal Company at Odon, Indiana — a Link-Belt designed and equipped plant.

A feature of this plant is the use of Link-Belt oscillating conveyors to tap off 6 x 4, 4 x 2, 2 x 1 ¼, and 1 ¼ x ¾ inch coal to the loading booms. Each oscillating conveyor handles two different sizes of coal by means of a separator compartment (see illustration at left).

A Link-Belt belt conveyor takes coal from the hopper where trucks dump the coal from the strip operation. This hopper is equipped with remote control reciprocating plate feeders which deliver the coal to the belt conveyor equipped with special impact idlers. Two Link-Belt air-pulsated washing units are used (see lower illustration at left).

We'll be glad to give you further details of this and other Link-Belt preparation plants. Get in touch with our nearest office.

LINK-BELT COMPANY

Chicago 9, Philadelphia 40, Pittsburgh 13, Wilkes-Barre, Huntington, W. Va., Denver 2, Kansas City 6, Mo., Cleveland 13, Indianapolis 6, Detroit 4, St. Louis 1, Seattle 4, Toronto 8.

11,340

COAL PREPARATION AND HANDLING EQUIPMENT

Engineered, Built and Backed by LINK-BELT